CIO

THE MAGAZINE FOR INFORMATION

APRIL 15, 1992
VOLUME FIVE NUMBER TEN
SEVEN DOLLARS

SPECIAL SECTION

STRATEGIC OUTLOOK ON DOWNSIZING:

How To Be An Easy Rider When Change Is In The Wind

Harley-Davidson's Rich Kolbe

AN INTERNATIONAL DATA GROUP PUBLICATION

If making all your computers and applications work together were as simple as hooking up another device or introducing a new technology, you would have done it by now.

But true systems integration isn't that simple. Because it takes more than technology to make it happen. It takes people as well. People who understand your business. People who understand how integrating a multi-vendor solution can affect your business. People who can advise you, consult with you, even train your users on multiple vendors' systems.

Digital has such people. Over 40,000 of them, actually. A global support and service group capable of solving all your systems integration problems.

Which means no matter how large your company or how small your work group, we can do everything from manage your multi-vendor solution to provide a single point of contact throughout every stage of a systems

NAS FROM DIGITAL.

© DIGITAL EQUIPMENT CORPORATION 1991. THE DIGITAL LOGO IS A TRADEMARK OF DIGITAL EQUIPMENT CORPORATION.

DIGITAL OPENS THE WAY TO SYSTEMS INTEGRATION.

integration program.

We've been doing so for more than a decade. Supporting multi-vendor networked solutions for hundreds of companies all over the world, while integrating over 8000 hardware and software products from more than 800 different vendors.

Concurrently, we've taken a leadership role in all the major standards bodies and consortia, helping to develop such widely accepted standards as Motif®, OSF®/DCE, X.400, IEEE/POSIX, OSI and scores of others. One result of which is our Network Application Support (NAS), which can help you build open, multi-vendor networks with true application interoperability across different platforms and operating environments.

Another result is the new and widely heralded Advanced Computing Environment (ACE) initiative. Destined to solve the software compatibility problems between RISC and x.86 products.

All of which means if you've got the will, Digital has the way to integrate all of your systems. To find out more, talk to a Digital representative. digital™

THE OPEN ADVANTAGE.

MOTIF AND OSF ARE REGISTERED TRADEMARKS OF THE OPEN SOFTWARE FOUNDATION.

No Fences. No Boundaries. No Limits. That's The Freedom Of CA90s.

The freedom to choose the best applications without worrying about hardware constraints.

The freedom to right-size your entire computing environment with the best mix of hardware platforms.

And the freedom to integrate and automate all your applications across the many proprietary, closed environments you face today. It's all there inside the most comprehensive architecture ever developed: CA90s.

The only architecture that supports every major hardware platform including IBM, Digital, Hewlett-Packard, Apple, Fujitsu, Bull, Data General, Tandem and Hitachi. All the major operating systems: MVS, VSE, VM, VMS, UNIX, APPLE, WINDOWS, DOS and OS/2.

And the world's broadest range of integrated software solutions, covering systems management, information management and business applications.

If you're tired of being fenced in, call 1-800-CALL CAI for complete information on CA90s.

The architecture that can set you free.

CA90s

COMPUTER® ASSOCIATES

Software superior by design.

©Computer Associates International, Inc. One Computer Associates Plaza, Islandia, NY 11788-7000. All product names referenced herein are trademarks of their respective companies.

CIO

VOLUME 5, NUMBER 10

Testing the corporate metal **54**
Cover photo by James Schnepf

STRATEGIC OUTLOOK **DOWNSIZING**

Keeping Up with the Ins and Outs 33

There are no perfect solutions, but CIOs testing the downsizing waters are discovering that this strategy is an unusually mixed bag of payoffs, tradeoffs and unanswered questions.

By Thomas Kiely

Hearts and Minds 44

There's no getting around the fact that downsizing equals culture shock. Inevitably, some percentage of souls will be shocked right out the door. But with careful planning, adequate support and creative persuasion, many souls can also be saved.

By Meghan O'Leary

Nuts and Bolts 48

Some are soaring, more are stumbling, and most have had to compromise on the thorny technical issues that bedevil downsizing organizations.

By Thomas Kiely

Means to an End 54

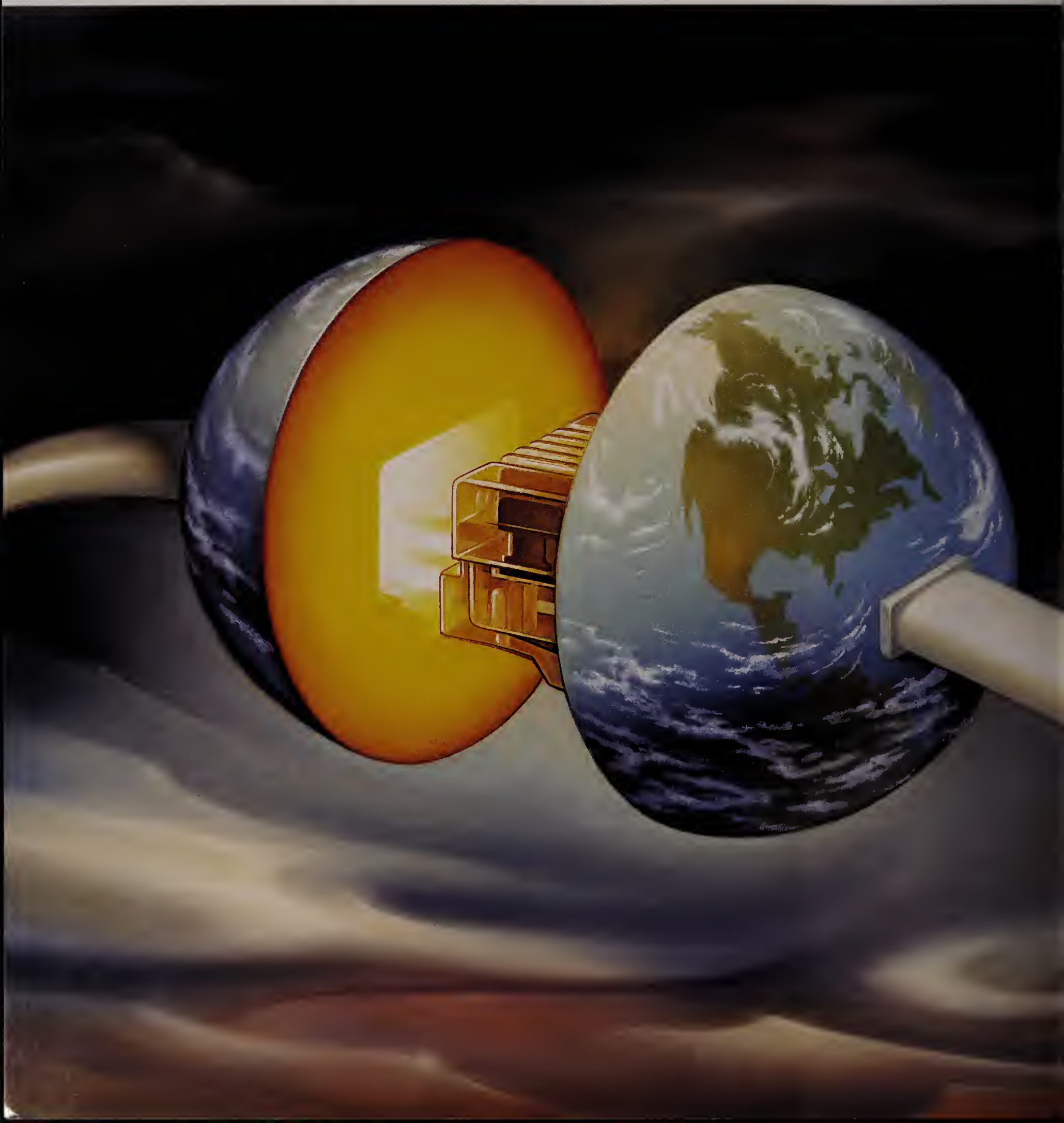
For a Cleveland-based metallurgical firm, downsizing is the logical outgrowth of a quality-driven reengineering project.

By Meghan O'Leary

Surviving the brave new world **44**

MORE ▸▸▸

Only NCR Is Putt



ing It All Together.

Open, Cooperative Computing Offers The World's Most Complete Open Computing Solutions.

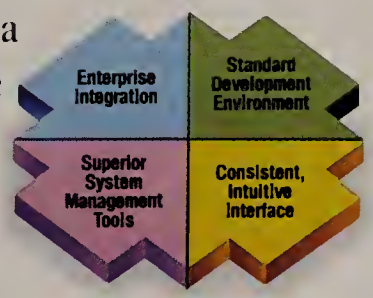
NCR has emerged as the leading supplier of a new way of computing. Offering performance enhancements and cost efficiencies superior by an order of magnitude to conventional mainframe-centered solutions. Designed to help your organization respond quickly to the challenges and opportunities of increasingly competitive world markets.

The NCR System 3000 Family is the most complete end-to-end open systems offering in the world.

No one is delivering more complete, and powerful, open systems solutions. A new generation of mobile computers with advanced networking built in. Pen-based systems. A full line of personal computers. Massively-parallel enterprise servers far surpassing traditional mainframes in power. NCR COOPERATION®—an innovative suite of enterprise integration software designed to help you re-engineer your business processes for greater efficiency. And the world's most comprehensive set of networking and connectivity products.

Our Open Networking Environment includes the most advanced networking and network management products available.

And that's just for starters. Our access to the world-famous R&D facilities of AT&T Bell Labs and the advanced parallel-processing technology of our Teradata organization will ensure that we maintain the lead in open enterprise computing solutions.



NCR COOPERATION is fast becoming the leading choice in enterprise integration software.

We have the people, the products, and the financial stability to provide you with powerful, cost-effective computing solutions worldwide. We're putting it all together for a growing number of forward-thinking organizations. We can do the same for you.

For a free brochure—"How To Build Truly Open, Enterprise-Wide Computing," phone 1-800-CALL NCR.

NCR
The Networked Computing Resource of AT&T

Open, Cooperative Computing.
The Strategy For Managing Change.

NCR is the name and mark of NCR Corporation. COOPERATION is a registered trademark of NCR Corporation. Teradata is a registered trademark of Teradata Corporation. © 1992 NCR Corporation.

Access

Re-engineering:
the software solution

The future is here but the past is still here too.
Client/server, point and click.... You need to support new approaches, but what about the years of effort and tens of millions of dollars tied up in existing mainframe applications?

Now you can have the best of both worlds.
With software from Early, Cloud & Company you can access 3270 applications from any terminal or workstation. You can simultaneously access different applications and integrate the information where needed. Access is immediate, and transparent. All without modifying existing applications.

Do more with less. Before you commit to a re-engineering strategy that requires a major hardware investment, consider the software solution.

To learn more about how you can have access,
call 1-800-829-2050 ext. 800.

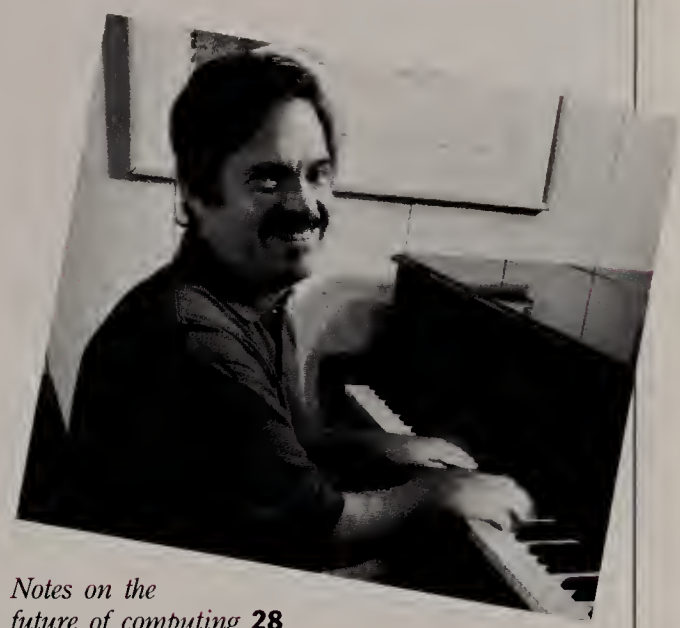
Early, Cloud & Company™
Aquidneck Industrial Park Newport, Rhode Island 02840

CIO

FEATURES

Intimate Technology, and All That Jazz 28

PC visionary Alan Kay riffs about the barriers to widespread computer literacy, the need for a new interface metaphor, the legacies of Martin Luther and Aldus Manutius, and why we don't need more Cobol programmers.
By Meghan O'Leary



Notes on the future of computing **28**

Freedom of voice **62**

COLUMNS

INSIGHTS: PROFILES IN MANAGEMENT 24

Today's IS executives are generally well paid, well satisfied and well disposed toward client/server technology and reshaping business processes, according to a recent survey by SIM.
By Edward R. Mills

HUMAN FACTORS: THE SHADOW ANALYSTS 58

Independent systems specialists laboring within your company's business units need to be brought into the mainstream.
By David J. Marley and Don W. Myers

STATE OF THE ART: LISTENING IN 62

Technologies that can recognize and act upon human speech are rapidly coming of age.
By Elaine Cascio

DEPARTMENTS

Editor's Letter 8

Publisher's Letter 12

Trendlines 14
- ▶ CIO conference
- ▶ Interview software
- ▶ Postal scanner
- ▶ Spending study
- ▶ New ventures
- ▶ Quality questionnaire
- ▶ Career moves
- ▶ The future of pen
- ▶ Dial-up IRS
- ▶ Environmental action
- ▶ AMS nominations

FYI 68

Events/Index 70

Off the Shelf 72

Dial and file **14**

Downsizing, rightsizing—call it whatever you want; it's here. During the past year, at least two new conferences dedicated to the trials and tribulations of downsizing have debuted. And the hefty attendance at those conferences suggests that the issue has touched an IS nerve.

More than a few consultants have hung out their downsizing shingles, and respondents to a recent survey by market researcher Input said they were moving a wide array of applications to a downsized environment.

This month our Strategic Outlook, researched and written by Senior Writers Meghan O'Leary and Thomas Kiely, examines current perspectives on downsizing.

To date, those experiencing downsizing fever report that their cost savings have been lower than expected. The cost of retraining IS professionals is high. And the effort to convince end-user departments, the beneficiaries of downsizing efforts, to take responsibility for local applications is daunting.

Interestingly, many IS executives do not yet understand that downsized solutions don't replicate the mainframe environment. The new platform has its strengths, but as the technology is still being developed, it also has some serious drawbacks.

CIOs report that making the move to a downsized environment is particularly stressful because it requires more contact with user departments, and IS staff must be more knowledgeable about business strategies. These ideas have been discussed for many years, but in the distributed environment the rubber meets the road, and some IS professionals just can't maneuver the curves.

In addition, a recent survey by Forrester Research estimates that while 28 percent of current IS staff already possess the skills to jump into the downsized environment and 58 percent are retrainable, the rest—an estimated 35,000 professionals—won't be able to adapt. Forrester figures it would cost about $35,000 to bring each IS employee into the new computing age.

Jim Dudziak of Brush Wellman Inc. states the case succinctly: "Everybody wants an organization that is more flexible, innovative, creative, entrepreneurial and responsive to change. When you start talking about all those characteristics, you start talking about a networked organization."

Downsizing may not be a reality in your organization today, but tomorrow isn't very far off.

Marcia Blumenthal

PHOTO BY WEBB CHAPPELL

CIO

© By CIO Publishing Inc

Publisher/Editorial Director Joseph L. Levy

Editor-In-Chief Marcia Blumenthal
Managing Editor Lew McCreary
Art and Design Director Mary Lester Marshall
Special Projects Editor Allan E. Alter
Associate Editor Abbie Lundberg
Associate Editor Leigh Buchanan
Senior Writer Thomas Kiely
Senior Writer Meghan O'Leary
Senior Writer Richard Pastore
Writer/Researcher Megan Santosus
Assistant Art Director Moira Gillis
Design Associate Kim Morneau
Editorial Assistant Mina C. Ahn

Director of Marketing Cathy O'Leary Hayes
Production Director Lori Beth Sadewitz
Director of Finance & Admin. Nancy A. Bryson
Assistant to the Publisher Diane Martin
Circulation Director Carol A. Spach
Fulfillment Manager Susan Woodworth
Sales & Marketing Specialist Bridget Cammarata
Marketing Intern Stephen Irving
Circulation Assistant Beverly Bigham
Administrative Assistant Lynn J. Palmquist

VP/GM, Executive Programs Lynda Rosenthal
Executive Program Manager Walter Manninen
Marketing Services Manager Lori Cardarelli

Contributing Writers Elaine Cascio, David J. Marley, Edward R. Mills, Don W. Myers

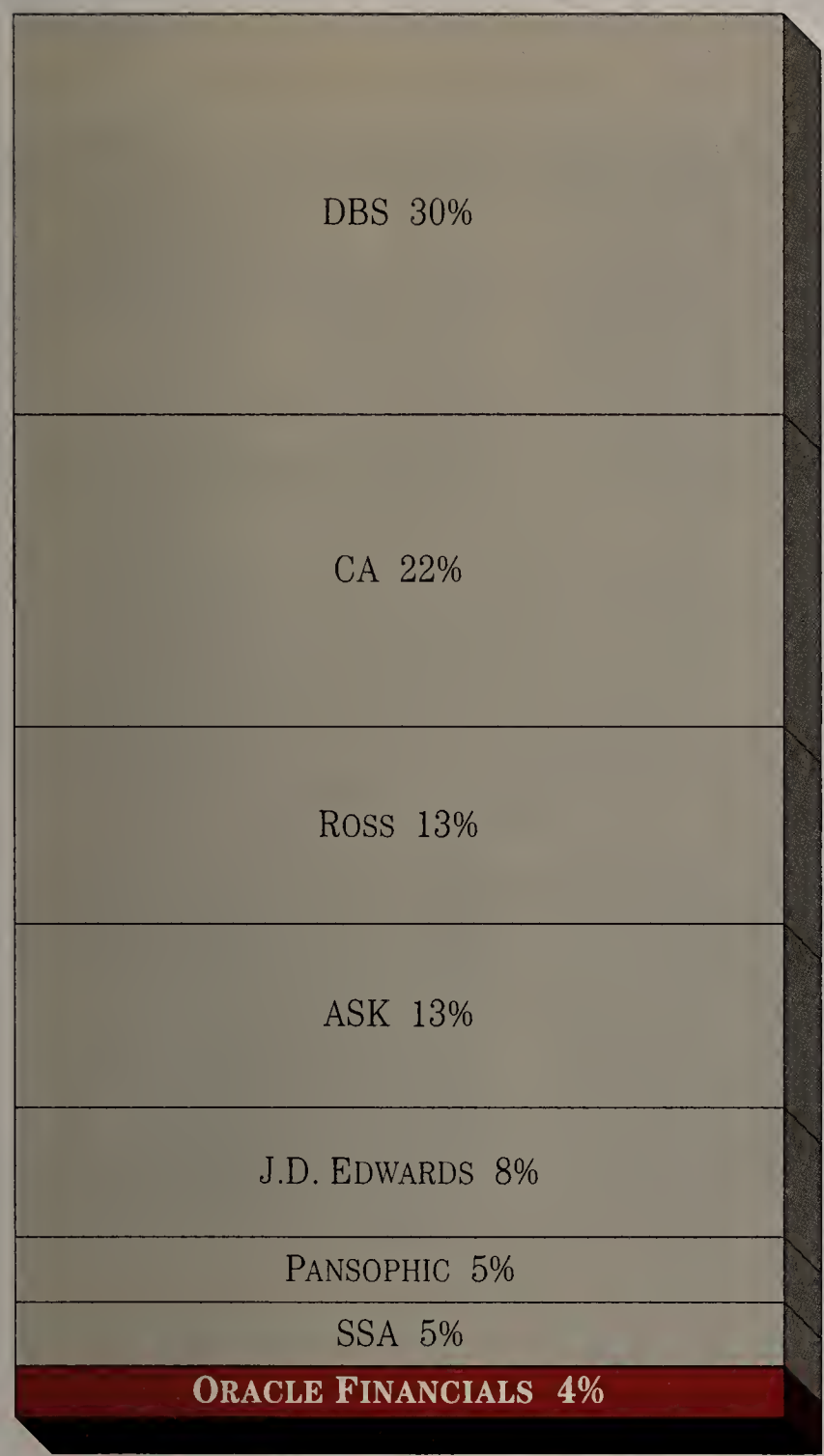
Editorial Offices CIO Publishing Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208 (508) 872-8200. **Subscriber Services** (800) 788-4605.

International Data Group
Board Chairman Patrick J. McGovern
President Walter Boyd
Executive Vice President William P. Murphy

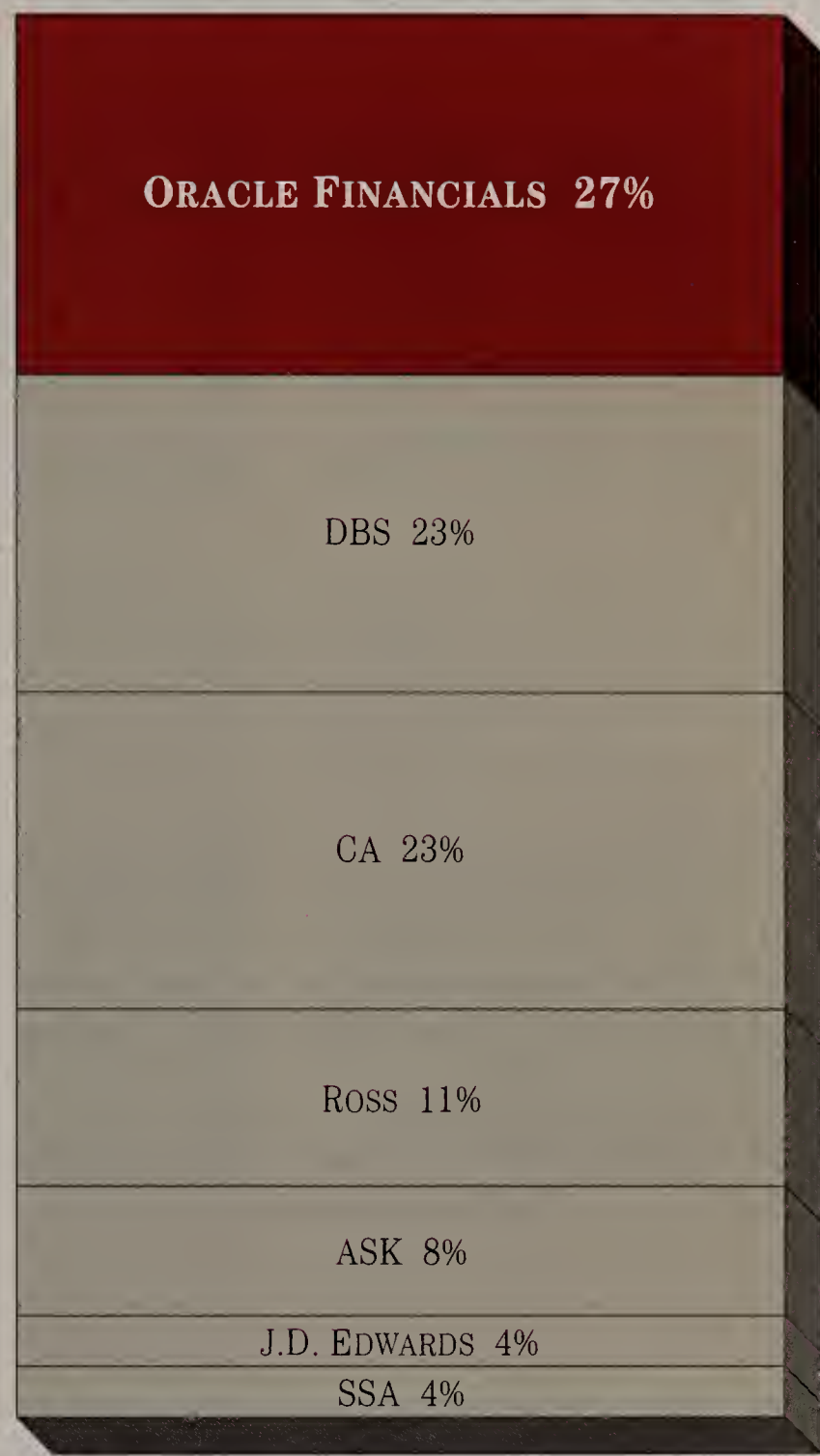
CID is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 150 computer publications in more than 50 countries. Thirty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA'S** Computerworld Argentina, Infoworld Argentina; **ASIA'S** Computerworld Hong Kong, Computerworld Southeast Asia, Computerworld Malaysia; **AUSTRALIA'S** Computerworld Australia, Australian PC World, Australian Macworld, Profit, Information Decisions, Reseller; **AUSTRIA'S** Computerwelt Oesterreich; **BRAZIL'S** DataNews, PC Mundo, Mundo IBM, Mundo Unix, Automacao & Industria, Publish; **BULGARIA'S** Computerworld Bulgaria; **CANADA'S** ComputerData, Direct Access, Graduate Computerworld; **CHILE'S** Informatica; **CDLOMBIA'S** Computerworld Colombia; **CZECHDSLDVAKIA'S** Computerworld Czechoslovakia, PC World Czechoslovakia, Network World, Nueral; **DENMARK'S** CAD/CAM WORLD, Computerworld Danmark, PC World Danmark, Macworld Danmark, Computerworld Focus, Lotus World, Macintosh Produktkatalog, Unix World, PC/LAN World; **EGYPT'S** PC World Middle East; **FINLAND'S** Mikro PC, Tietoviikko, Tietotekniikka, Tietoverkko; **FRANCE'S** Le Monde Informatique, Distributique, Compu Search, Golden, Computer Direct, InfoPC, Telecoms International, Le Guide du Monde Informatique; **GERMANY'S** Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwelt, OS/2 Welt, PC Woche, PC Welt, Unix Welt, Unit, Lotus Welt; **GREECE'S** PC World; **HUNGARY'S** Computerworld SZT, Mikrovilag Magazin, PC Vilag; **INDIA'S** Computers & Communications; **ISRAEL'S** People & Computers; **ITALY'S** Computerworld Italia, PC World Italia, Macworld Italia, Network World Italia; **JAPAN'S** Computerworld Japan, Macworld Japan; **KDREA'S** Computerworld Korea, PC World Korea; **MEXICO'S** Computerworld Mexico, PC Journal; **THE NETHERLANDS'** Computerworld Netherlands, LAN Magazine, Mac Magazine, Computer! Totaal; **NEW ZEALAND'S** Computerworld, PC World; **NIGERIA'S** PC World Africa; **NORWAY'S** Computerworld Norge, C World, PC World Norge, PC World Ekspress, IDG Direct Response, Multimedia and Desktop, Lotus World, PC World's Product Guide, Student's DP-Guide, Publish! World, Macworld Norge; **PERU'S** PC World; **PEDPLE'S REPUBLIC OF CHINA'S** China Computerworld, PC World China, IDG HIGH TECH Newproductworld; **PHILIPPINES'** Computerworld, PC World; **POLAND'S** Computerworld Poland; **ROMANIA'S** Infoclub; **RUSSIA'S** CADWorld, Computerworld, Networks, PC World; **SPAIN'S** CIMWorld, Communicaciones World, Computerworld Espana, PC World Espana, Macworld, PC World Autoedicion, Amiga World, Publish; **SWEDEN'S** ComputerSweden, Mikrodatorn, Macworld, CAD/CAM World, Lotus, Windows, Svenska PC World, Lokala Natverk/LAN, Affarsekonomi Management, Attack, CAP, Datalngenjoren, Data & Telekommunikation, Maxi Data, Digital/Varlden, Unix; **SWITZERLAND'S** Computerworld Schweiz, Macworld Schweiz; **TAIWAN'S** Computerworld Taiwan, PC World Taiwan; **THAILAND'S** Thai Computerworld; **TURKEY'S** Computerworld, PC World; **UNITED KINGDOM'S** Lotus, Macworld; **UNITED STATES'** Amiga World, CIO, Computerworld, Computer Buyers World, Digital News, Electronic News, Federal Computer Week, GamePro, inCider A+, IDG Books, InfoWorld, Lotus, Macworld, MPC World, NeXTWORLD, Network World, PC Games, PC World, Portable Office, PC Letter, Publish!, Run, SunWorld; **VENEZUELA'S** Computerworld Venezuela, MicroComputerworld Venezuela; **YUGDSLAVIA'S** Moj Mikro

BPA

The Financial Software Market Has Just Been Turned Upside Down.



In Use†



Planned For Purchase '91-'92†

According to a recent survey of Datamation Magazine readers conducted by Cowen & Co., Oracle Financials are turning the applications market on its head. And as the biggest players move down to make room for us, it isn't hard to figure out why.

Oracle Financials are the modern alternative to the ineffective, unresponsive financial software built in the '70s. They are, in fact, the only major financial software to be based on relational technology.

Which means that in a continually changing corporate environment, Oracle Financials can be quickly configured to keep pace with reorganizations, mergers and acquisitions. All without programming. So you always have the information you need to manage your business.

And like all Oracle products, Oracle Financials run on virtually any computer you have today, or will have tomorrow. On mainframes, minicomputers, workstations or PCs; on terminals or in client-server configuration.

To find out more about Oracle's open family of portable software and the education, consulting and support services that stand behind it, call 1-800-633-1059 Ext. 9668.

We'll turn your present notions about financial software upside down.

ORACLE®

Software for people who can't predict the future.

† Relative percent of mentions among top eight independent vendors. ©1992 Oracle Corporation. ORACLE and Oracle Financials are registered trademarks of Oracle Corporation. Datamation is a trademark of Cahners Publishing Associates, L.P. Other trade names referenced are the trademark of the respective manufacturer. Call for hardware and software requirements. Outside the U.S.A. but within North America, call 1-800-668-8925 for product, service, and seminar information.

The IEF™ works. For Aetna. For Rhône-Poulenc Rorer.

The success of Texas Instruments I-CASE product is proven—in the field.

There is an integrated CASE product that works. It works now...and it works well.

The IEF™, or Information Engineering Facility™, is in use now by successful companies, large and small, all over the world.

Major gains in productivity, quality, and maintainability.

Productivity gains in initial development are hard to measure, but reports of 2-to-1 improvements are fairly common—and some go as high as 5-to-1.

Quality improvements are dramatic. Users are getting more of what they need to run their businesses. Systems get up and running easier and faster.

As for maintenance, a Gartner Group study showed that, even back in 1990, more than 80% of IEF developers were getting gains of from 2-to-1 to 10-to-1.

Now, develop on PC and generate for DEC/VMS, UNIX. TANDEM, WINDOWS available soon.

The IEF has generated applications for IBM mainframe environments (MVS/DB2 under TSO, IMS/DC and CICS) since early 1988. Now you can develop systems in OS/2 and automatically generate for DEC/VMS and some UNIX platforms. TANDEM, Microsoft® WINDOWS, and more UNIX will be available soon.

Developers give IEF highest rating in COMPUTERWORLD.

COMPUTERWORLD magazine's "buyer's scorecard" showed that developers ranked the IEF first among all I-CASE products in the study, particularly in the areas of application quality, programmer productivity, and value for the dollar.

New tutorial provides very fast, friendly IEF training.

We believe our new Rapid Development Tutorial is a breakthrough in CASE training. We gave it the broadest possible beta test—more than 100 companies participated. Developers were able to learn to build systems with the IEF more quickly than ever before—some in as few as five days!

Special "Starter Kit" offer combines new tutorial and full-capability PC toolsets.

The new IEF Starter Kit will give you everything you need to start building systems with I-CASE on your OS/2 PC.

Along with the tutorial, the kit includes our standard OS/2 PC analysis, design and construction toolsets as well as testing and code generation in C. (A COBOL compiler is optional and priced separately.)

There's also 90 days of "hotline" support.

The kit is priced at $10,000 (limit one per customer company). That's about one-half the regular cost of the toolsets.

If you're not convinced that the IEF can work for you, here's a chance to see for yourself—at a special low price and (with the new tutorial) in a very short time.

To order an IEF Starter Kit, or for more information, call 800-527-3500.

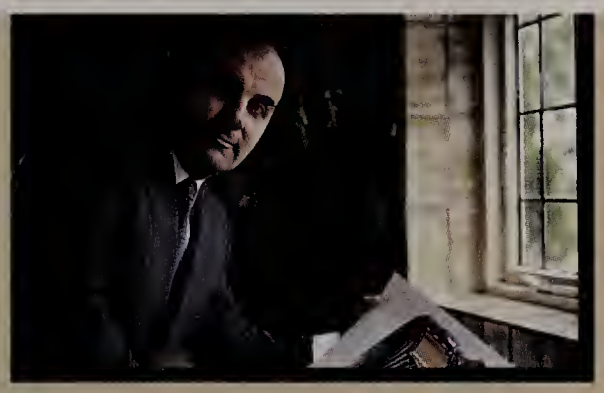
Government purchasers, please reference GSA #GS00K92AGS5530

TEXAS INSTRUMENTS

© 1992 TI.
Information Engineering Facility and IEF are trademarks of Texas Instruments.
Other product names listed are the trademarks of the companies indicated.
230015-R2

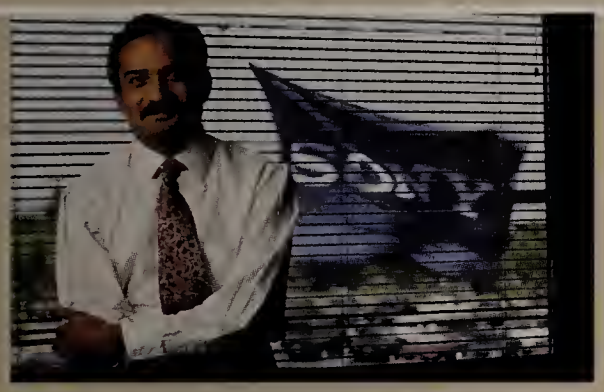
Target. Rolls-Royce. Canadian Airlines. Sony.

"Our first major project was a mission-critical system for our Managed Care operation. Conventional development would have taken 2-3 years...with the IEF, we built the first release in only 13 months. The IEF is now our company CASE standard."
Richard F. Connell
VP, Information Technology
AETNA



"MERLIN is mission-critical—the most far-reaching business systems initiative we've ever undertaken. Over 400 transactions are in production, with 800 more to be added in the next three months. We could not handle this scale and complexity without IE/IEF."
Wal Budzynski
Head of Operations, Systems/Computing
Rolls-Royce Aerospace

"With previous methods, we would have had to compromise on an 'okay' 10-screen Lease Accounting system. With the IEF, our users got everything they wanted—an outstanding 40-screen system—in the same time. They are requesting the IEF for all future systems."
Tom Jeffery
Sr. VP, Information Systems
Target



"The IEF offers dramatic improvements in productivity, yet it's easy to learn. One example: We trained 23 developers, including 18 new hires, and then completed a large order processing system—300 transactions —all in only 20 months."
Venkat (Vinnie) Tiruviluamala
Director, CPC/CPPC Information Systems
SONY Corporation

"We used an IEF frequent flyer template to build our 'Canadian Plus' system. A major redesign, estimated at 4-6 months using previous methods, took less than a month. Now we're providing better customer service, and maintenance costs are greatly reduced."
Bill Palm
President, Canadian Technology Services
Canadian Airlines

"Our new Customer Order Services Marketing Information System—over 500 transactions and 250 entities—is in production. Quality is excellent and our users are very pleased. Dedicated people armed with the IEF advantage have made COSMIS a success."
James R. Engle
Director, Systems and Programming
Rhône-Poulenc Rorer

"Your new IEF tutorial was a way to quickly become familiar with the IEF and see how the IEF will allow quality systems to be built very quickly. I feel I now know how to build systems using the techniques described."
Roger Strand
Application Development Consultant
First Federal Lincoln

"The IEF tutorial is very well done. I feel comfortable with this software and I have acquired the skills to build simple systems. The tutorial is a very fast and effective means of evaluating the capabilities of the IEF."
Margaret Kubaitis
Research Programmer, IS&S
University of Illinois

"The IEF tutorial is put together very well and quickly illustrates how to construct a system using the IEF. It gives one the basics to start getting the job done. I feel I am prepared now to build simple systems using the IEF."
K. E. Peacock
Data Administrator
City of Saskatoon, Saskatchewan

How To Get Twice As Much Done With Half As Many People In A Third Less Time.

That's what a major pharmaceutical company did as a result of implementing methodologies from SPECTRUM International in the early 80's.

They boosted code production, while slashing abended programs, cutting IS hours charged per program, and reducing maintenance backlog.

What's so unique about this story? Actually, nothing.

Since 1968, SPECTRUM International has used proven methodologies to help hundreds of clients speed projects to completion. Increase productivity. Lower costs. And improve user satisfaction.

We've solved I/S project management problems for clients in banking, finance, education, energy, food and beverage, government, insurance, manufacturing and transportation.

We may have your problem solved already. It costs nothing to find out. For a free consultation, call (412) 221-8580.

SPECTRUM

Spectrum International, Inc.,
2600 Boyce Road,
Pittsburgh, PA 15241
Phone 412▾221▾8580
Fax 412▾221▾8741

"The jury is still out on downsizing. More questions are being asked about it than answers are being supplied."

—James Metzger
General Manager of
Information Technology
Texaco Inc.

The above quote from Texaco's James Metzger reflects sentiments shared by many information technology executives we spoke with to prepare this issue's "Strategic Outlook" report on downsizing. While our editorial staff uncovered a number of successful downsizing pioneers, the bottom line is that many CIOs remain skeptical.

Their questions and concerns are legitimate: What cost savings will my organization achieve? What are the "hidden" costs? What are the advantages and disadvantages of downsizing technologies? How will we retrain IS staff and end users to exploit the new technologies, and at what cost? And ultimately—what measurable, enterprisewide information-management benefits will downsizing provide?

It seems to me that IT vendors, downsizing experts and consultants owe it to CIOs to dispel these anxieties by addressing their concerns in layperson's language. Forums such as our CIO Perspectives conferences provide opportunities for education and information exchange (see Page 22 for a report on our most recent event). And IT vendors whose products and services fit into the downsizing trend can certainly address CIOs' concerns through ongoing marketing and customer-communications programs.

Beyond education, the greatest service we can provide CIOs facing the downsizing dilemma is to help them set *realistic* expectations about cost savings and benefits *as well as* potential drawbacks. By so doing, we can move CIOs off the bench and onto the downsizing playing field.

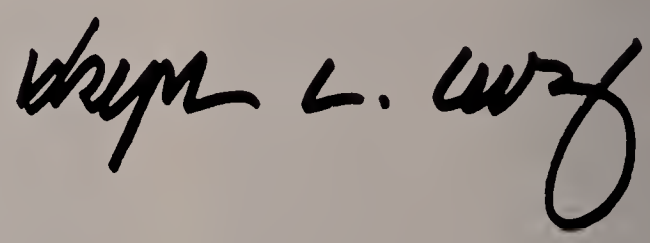
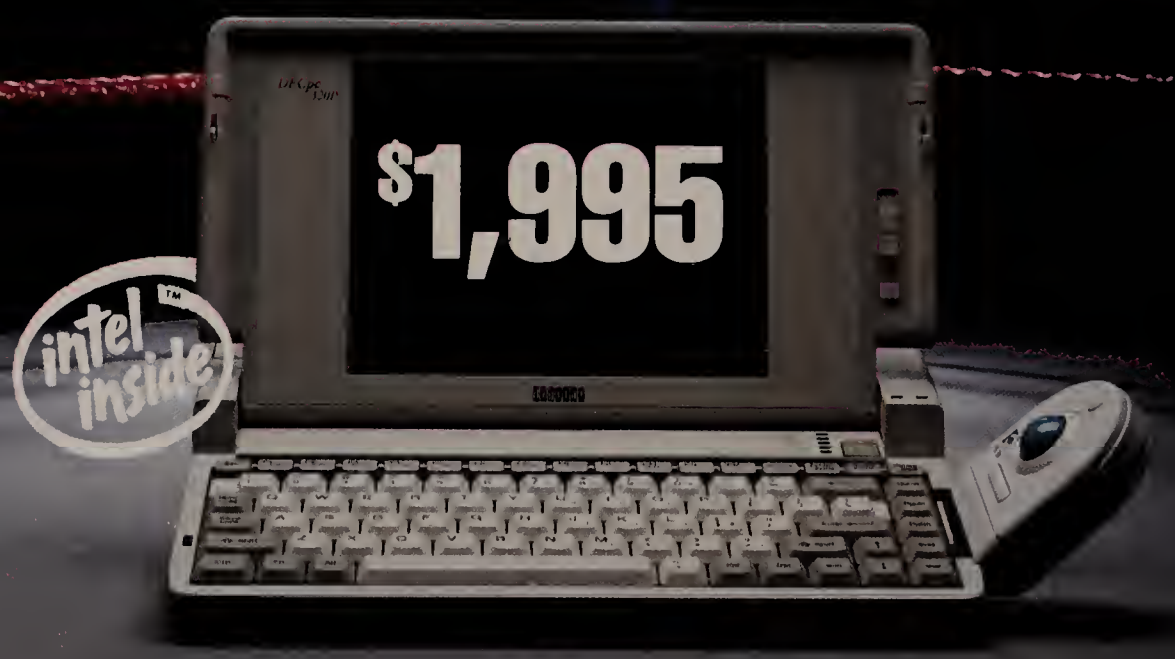


PHOTO BY GEORGE SIMIAN

DIGITAL™ HAS A MESSAGE
FOR ANYONE TIRED OF TAKING IT
ON THE CHIN



WE'RE IN YOUR CORNER

Desktop Direct™ from Digital™

Today's economy is tough. That's why Desktop Direct from Digital is determined to keep performance peak. Prices down. And service unparalleled.

So now there's no reason to take a dive when it comes to buying a notebook computer. Digital's 6.4 lb. DECpc™ 320P Notebook lets you float like a butterfly at a price—$1,995—that doesn't sting like a bee.

A 6.4 lb. featherweight that packs a 20 MHz punch.

With an i386sx, 20MHz processor, 2MB of memory (expandable to 8MB) and a 40MB (optional 80MB) hard drive, the 320P Notebook packs all the punch of much larger PCs. So you can use your fancy footwork far from your office—without sacrificing computing power. And because the 320P Notebook comes preloaded with DOS 5.0

and Windows 3.0, you're ready for action.

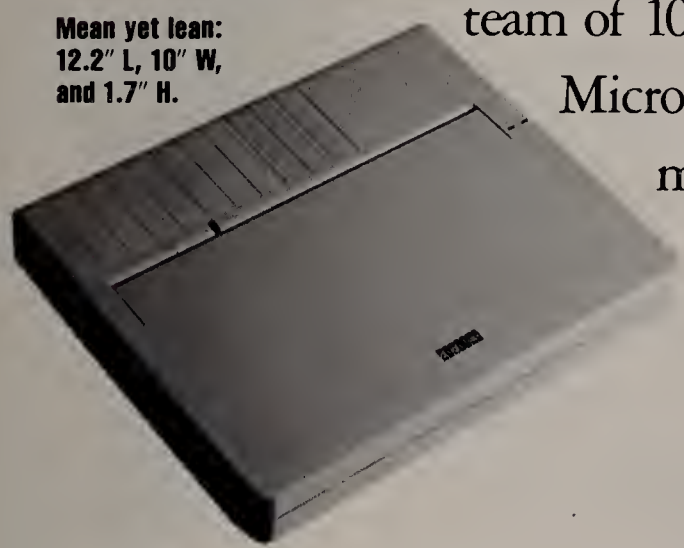
So keep moving. Our 320P Notebook's NiCad battery has a 3+ hour capacity to help you go the distance. An easy-to-carry AC power supply boosts energy between rounds. And a special Auto-Resume feature spares you the aggravating lag time of having to reboot—and keeps your guard up when you're switching power sources!

A 3+ hour battery life for those extra-long bouts.

But seeing is believing. Look at our crisp, speedy Triple Super Twist (TST) backlit screen. Put the 2400 baud modem to the test. Roll the Logitech TrackMan Portable mouse. We think you'll agree this is the stuff champions are made of.

In the unlikely event, however, that you find yourself on the ropes, Digital helps you bounce back. We'll send you your repaired Notebook within 48 hours. And, through our Multivendor Support plan, we can even put our competitors' PCs through their paces, too. The Desktop Direct team of 10,000 can support products from Microsoft®, Apple®, Dell®, IBM® and many others.

Now the odds are in your favor.



Mean yet lean: 12.2″ L, 10″ W, and 1.7″ H.

Desktop Direct FROM Digital

OPEN For Business

1-800 PC BY DEC
(1-800-722-9332)

Please reference APJ when you call.

Mon-Fri 8:30am to 8:00pm (ET)

THE WINNER BY A TKO

The DECpc 420sx

Every i486-based system to come along stakes a claim to the heavyweight PC title. But as the saying goes, the bigger they are, the harder they fall.

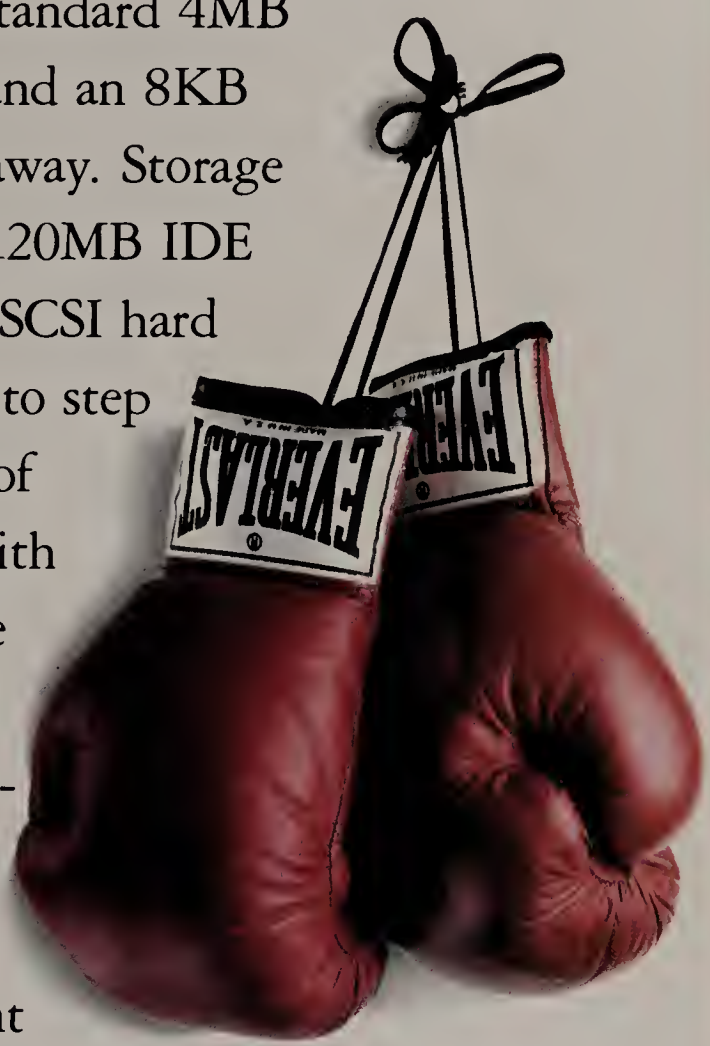
That's why Desktop Direct from Digital built a 20MHz i486sx system that's lean enough to be affordable (at $2,429) and mean enough to deliver a knockout blow.

Besides support for 32MB memory, the 420sx packs a punch that hits you right between the eyes: state-of-the art, non-interlaced video technology for 1024 x 768, 256 color graphics.

And because Digital's engineers are always in training, they designed the 420sx to have every possible competitive edge in PC prizefighting. One

example: all components—including the video and memory—are installed on the main logic board. That means better performance without higher prices.

What's more, the 420sx is always ready to step up to a real heavyweight challenge. Its standard 4MB of memory is expandable to 32MB, and an 8KB memory cache is constantly jabbing away. Storage options include 52MB, 105MB and 120MB IDE hard drives and 209MB and 426MB SCSI hard drives. That's just the bulk you need to step into the ring with the big guys. And of course, the 420sx comes preloaded with DOS 5.0 and Windows 3.0—so you're ready for a workout right away.



As with all Desktop Direct products, the 420sx is backed by our 30-day money back guarantee and our one year, on-site, no fine print warranty—at no extra charge. So you can rest assured that no matter how tough your challenge, the world's second largest computer company is always in your corner.

When you're ready, call us at 1-800 PC BY DEC (1-800-722-9332). We're in your corner.

52MB, 105MB, or 120MB hard drive gives you plenty of storage muscle.

Desktop Direct FROM Digital

OPEN For Business

1-800 PC BY DEC
(1-800-722-9332)

Please reference APJ when you call.
Mon-Fri 8:30am to 8:00pm (ET)

PUT YOUR PC TOGETHER ON PAPER

FAX
TOLL FREE TO
1-800-524-5694

and we'll send you a special system recommendation. Or call 1-800-722-9332 and we'll recommend by phone.

Your Name _____

Title _____

Company Name _____

Address _____

City _____ State _____ Zip _____

Your Telephone No. _____ Your FAX No. _____

I'd like information on:

- ☐ DECpc i386 and i386sx based systems
- ☐ DECpc i486 and i486sx based systems
- ☐ The DECpc 320P Notebook
- ☐ The Catalog

APJ

Customization Worksheet

Your base system is a: ☐ 286 ☐ 386 ☐ 486 ☐ Other

How many applications will your PC(s) run in a typical workday? _____

What best describes the type of work the system will be used for? (Check all that apply)

- ☐ Word Processing
- ☐ Order-entry
- ☐ Database (filing records)
- ☐ Financial Calculations
- ☐ Retail Store Management
- ☐ Desktop Publishing
- ☐ Education
- ☐ Design (CAD/CAM)
- ☐ Engineering
- ☐ Industrial Process Control
- ☐ Scientific Research
- ☐ Software Development
- ☐ E-Mail
- ☐ Other industry-specific applications (please specify)

How many people work in your group, department or small business?
☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:
☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX™ ☐ Other

Which of the following graphics-oriented applications best describes your needs? (Check all that apply)

- ☐ Desktop Publishing
- ☐ CAD/CAM
- ☐ Realtime Modeling
- ☐ Animation
- ☐ Image Processing
- ☐ AutoCad
- ☐ Business Graphics

LAN Communication

How many PCs do you have installed? _____ From how many manufacturers? _____

What kinds of connections does your PC(s) require? (Check all that apply)

- ☐ Links with other PCs in the immediate surroundings
- ☐ Connection to the local area network (LAN) throughout a building
- ☐ A line to a host system in a remote location

What kind of media (cable) is used in your LANs today? _____

What is the networking software now being used in your company? _____

What kind of host system will your PC communicate with?
☐ DECpc ☐ IBM ☐ Other _____

What Kind of Service Do You Really Need?

☐ On-site Hardware Support ☐ Software Support ☐ Telephone Support
☐ Training ☐ FAX Hotline

How many of your users take portables on the road? _____

Do you currently have a service contract(s) for your PCs? How many? _____

digital™

i486, i386sx, i486sx and Intel are trademarks of Intel Corporation. Windows and DOS are trademarks and Microsoft and MS-DOS are registered trademarks of Microsoft Corporation. Logitech is a trademark and TrackMan is a registered trademark of Logitech International S.A. Apple is a registered trademark of Apple Corporation. Dell is a registered trademark of Dell Corporation. Everlast is a registered trademark of Everlast Sports Manufacturing Corporation.

The DIGITAL logo, DECpc and DECstation are trademarks of Digital Equipment Corporation.

Desktop Direct FROM Digital
OPEN For Business

1-800 PC BY DEC
(1-800-722-9332)

Please reference APJ when you call.

Mon-Fri 8:30am to 8:00pm (ET)

TECHNICAL

The **DEC**pc 320P Notebook

Includes:

Microprocessor:	Intel i386sx running at 20MHz
Memory:	2MB
Storage:	40MB IDE Hard Disk Drive 3.5″ 1.44MB Floppy
Display:	TST Backlit VGA
Modem:	2400 bps Data
Keyboard:	84-key
Mouse:	Logitech™ TrackMan® Portable
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0 (factory installed)

(Carrying case included)

Special Package Price **$1,995**

FR-PCP11-AA

NEW LOW PRICE

DESKTOP DIRECT 48 HOUR TURNAROUND

The **DEC**pc 316sx

Includes:

Microprocessor:	Intel i386sx running at 16MHz
Memory:	2MB, 80ns Memory Kit
Storage:	52MB IDE Hard Disk Drive 3.5″ 1.44MB Floppy
Resolution Mode:	1024 X 768 SVGA Adapter
Display:	14″ Multi-sync VGA Color Monitor
Keyboard:	101-key
Mouse:	Three-button
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

Special Package Price **$1,799**

DJ-PC444-06

NEW LOW PRICE

DESKTOP DIRECT 48 HOUR TURNAROUND

The **DEC**pc 420sx

Includes:

Microprocessor:	Intel i486sx running at 20MHz
Memory:	4MB expandable to 32MB on main logic board
Storage:	105MB IDE Hard Disk Drive 3.5″ 1.44MB Floppy
Video Adapter:	1024 X 768 VGA with 512KB of video RAM upgradeable to 1MB to support 256 colors
Display:	14″ Multi-sync VGA Color Monitor
Keyboard:	101-key
Mouse:	Three-button
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

Special Package Price **$2,429***

DJ-PC445-09

DESKTOP DIRECT 48 HOUR TURNAROUND

*And even with these prices, other Desktop Direct discounts apply!

KNOCKOUTS!

The **DEC**pc 320P Notebook

Includes:

Microprocessor:	Intel i386sx running at 20MHz
Memory:	2MB
Storage:	80MB IDE Hard Disk Drive 3.5" 1.44MB Floppy
Display:	TST Backlit VGA
Modem:	2400 bps Data
Keyboard:	84-key
Mouse:	Logitech™ TrackMan® Portable
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0 (factory installed)

(Carrying case included)

Special Package Price **$2,495**

FR-PCP11-FA

DESKTOP DIRECT 48 HOUR TURNAROUND

The **DEC**station™ 320sx

Includes:

Microprocessor:	Intel i386sx running at 20MHz
Memory:	2MB, 80ns Memory Kit
Storage:	52MB IDE Hard Disk Drive 3.5" 1.44MB Floppy
Resolution Mode:	1024 X 768 SVGA Adapter
Display:	14" Multi-sync Color Monitor
Keyboard:	101-key
Mouse:	Three-button
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

Special Package Price **$1,899**

DJ-PC443-06

NEW LOW PRICE

DESKTOP DIRECT 48 HOUR TURNAROUND

The **DEC**pc 433 Workstation

Includes:

Microprocessor:	Intel i486 running at 33MHz
Memory:	8MB, 70ns Memory Kit
Storage:	40MB IDE Hard Disk Drive 3.5" 1.44MB Floppy
Resolution Mode:	1280 X 1024 TIGA Adapter
Display:	20" Color Monitor
Keyboard:	101-key
Mouse:	Three-button
Operating Systems:	MS-DOS 5.0 and MS-Windows 3.0

Special Package Price **$4,999**

DJ-PCW10-02

NEW LOW PRICE

DESKTOP DIRECT 48 HOUR TURNAROUND

Desktop Direct FROM Digital

OPEN For Business

1-800 PC BY DEC

(1-800-722-9332)

Please reference APJ when you call.

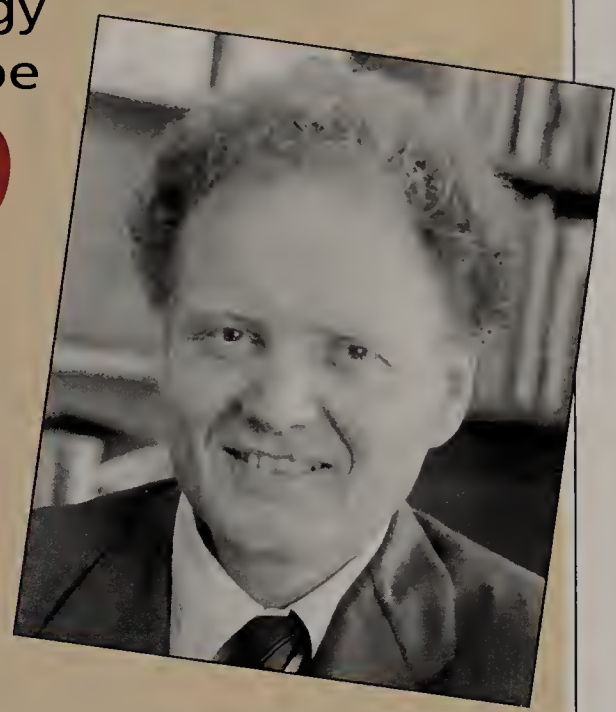
Mon-Fri 8:30am to 8:00pm (ET)

"America must adjust its business processes to conform to those of the rest of the world. . . . Our skills, our plants and equipment, our technology and our management abilities have to be better than the rest of the world's."

LESTER THUROW

"Uh-oh!"

ROBERT FULGHUM



THE CIO PERSPECTIVES SERIES[sm]

The Process of IT: Organizing for Success

A three-day conference defining the components of successful information technology management: The infrastructure, technologies that impact business, and management and control issues.

Sunday, October 11 through Wednesday, October 14, 1992
Boca Raton Resort & Club
Boca Raton, Florida

For more information or to enroll, call 800/366-0246

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

CORPORATE HOSTS

Microsoft®

BOOZ·ALLEN & HAMILTON

Racal-Datacom™

COMPUTER ASSOCIATES™
Software superior by design.

Stratus

EDS
TAKE ADVANTAGE OF CHANGE™

Technology Investment Strategies Corporation

HEWLETT PACKARD

TEXAS INSTRUMENTS

TRENDLINES

INTERVIEW SOFTWARE

A Sympathetic Ear

Graduate students are notorious for their limited resources and limitless ingenuity. So when Timothy Lynch found himself unable to afford a research assistant to help with his doctoral dissertation, he went ahead and created one.

The dissertation concerned the effects of computers on their users, and the assistant, not surprisingly, was a software program that allows researchers to electronically conduct qualitative studies on a large scale. The program, called Sigmund, is now available commercially from Lynch's company, Psychsoft of North Quincy, Mass.

Using Sigmund, researchers can interview more subjects—as many as 1,000 a week—while improving the accuracy of the data collected. A market researcher, for example, could formulate questions about buying habits on the computer and then mail out multiple disks to respondents or conduct interviews via modem or on computers set up in public places, such as shopping malls.

Interview programs are nothing new, of course, but Sigmund is special in that it can gather qualitative as well as quantitative data, formulating follow-up questions based on a subject's responses.

The program creates questions based on sample interviews and then uses artificial intelligence to customize those questions to suit the research being conducted. And Sigmund saves researchers time and increases the accuracy of their information by automatically storing data that is collected during the interview process.

Respondents may also be more candid and expansive in their answers, since research shows that subjects generally feel more comfortable talking to a computer than to a human interviewer. The anonymity provided by a machine is particularly valuable in certain types of medical research, where people may skew their answers in order to protect their privacy. The National Institutes of Health provided a grant for the product's development and plans to use Sigmund in conducting a massive AIDS-related research project.

Sigmund operates on MS-DOS IBM PCs and compatibles. The initial release sells for $200; a full version featuring some advanced data-analysis tools will sell for $600.

Pens Are Poised

Significant numbers of CIOs are receptive to pen-based computing, according to a survey of large-company information executives conducted by Dream IT Inc., of Cambridge, Mass. In results that should warm pen vendors' hearts, Dream IT principal Portia Isaacson reports that slightly better than half of the 68 respondent CIOs will test pen technology in 1992, and 15 percent plan major purchases.

Although only 50 percent of those surveyed described themselves as knowledgeable about pen-based computing, 78 percent said the technology will be of immediate value to their corporations. According to Isaacson, this shows a "positive predisposition" toward the technology. Fifty-three percent said they expect the chief value of pen-based systems will be improved efficiency, enabling key business processes to be accomplished faster and hence more economically. Respondents ranked sales (55 percent), operations (38 percent), maintenance (16 percent) and service (13 percent) as the top four likely beneficiaries of the technology. Sixty-three percent said they expect pen computers will eliminate paper forms.

When asked about the most important characteristic of pen-input hardware, 65 percent of the CIOs agreed that reliability and ruggedness were paramount. Isaacson regards pen-based computing as being at the developmental point the PC occupied in 1981. She reports on pen computing in a reference guide called the *Pen-PC Reference Report: Products and Markets*. For further information call 617 354-2160.

Career Moves

CHARLES FELD, architect of Frito-Lay Inc.'s much-touted hand-held computer distribution and inventory system, announced his intent to leave the Dallas snack maker to establish an independent systems consultancy. In his 11 years as IS chief, Feld, 50, earned industry acclaim for IT innovations that served as models for fellow Pepsico subsidiaries and others. Feld will remain aboard until his replacement is found.

JOHN FOY, senior vice president at the New York Life Insurance Co., has been named to head the company's information systems and services department. Most recently Foy had been head of individual policy services. He replaces Thomas Pettibone, who left New York Life to pursue other career opportunities, according to the company.

WILLIAM E. EAGER, executive vice president and senior operations officer of First Bancorporation of Ohio, has been appointed president and CEO of the bank holding company's Services Division, which is responsible for operations and technology. The division sells a broad range of computer and communications-based services to companies in the Midwest.

RICHARD A. DETWEILER has been elected president of Hartwick College, located in Oneonta, N.Y. Detweiler, currently vice president and tenured professor of psychology at Drew University in Madison, N.J., is the architect of an award-winning implementation of information technology for higher education.

ILLUSTRATION BY JAMES KACZMAN

Russell West
Senior Vice President
Strategic Planning
Comdisco, Inc.

"There is a way to measure the quality of your technology decisions."

"Don't reduce your technology costs in such a way that they can't *continue* to be reduced. The last thing you want is to save budget dollars today at the expense of mortgaging your future.

"With the right strategy, it's possible to continually reduce your costs. Is your current strategy letting you do that? To find out, use the market as a yardstick. Compare what's been happening to your expenses over the last few years with market trends. Then look at what's likely to happen in the future. That'll tell you the answer real fast.

"Every good technology strategy is built on a sound financial footing. That takes market knowledge and creativity. And that's where Comdisco excels.

"If you're not sure whether your strategy measures up to the realities of today, talk to us. We'll show you some smart ways to solve your problems, and we'll save you money. That's Comdisco's job, and nobody does it better."

Comdisco is one of the world's largest and most experienced independent high-tech asset consultants. Our strength is people like Russ West...people who know your problems and how to solve them. Let us show you how to measure—and improve—the quality of your technology decisions.

COMDISCO®

HIGH-TECH ASSET MANAGEMENT SOLUTIONS

FOR A FREE
INFORMATION PACKET
CALL 708-689-3000
EXT. 4530.

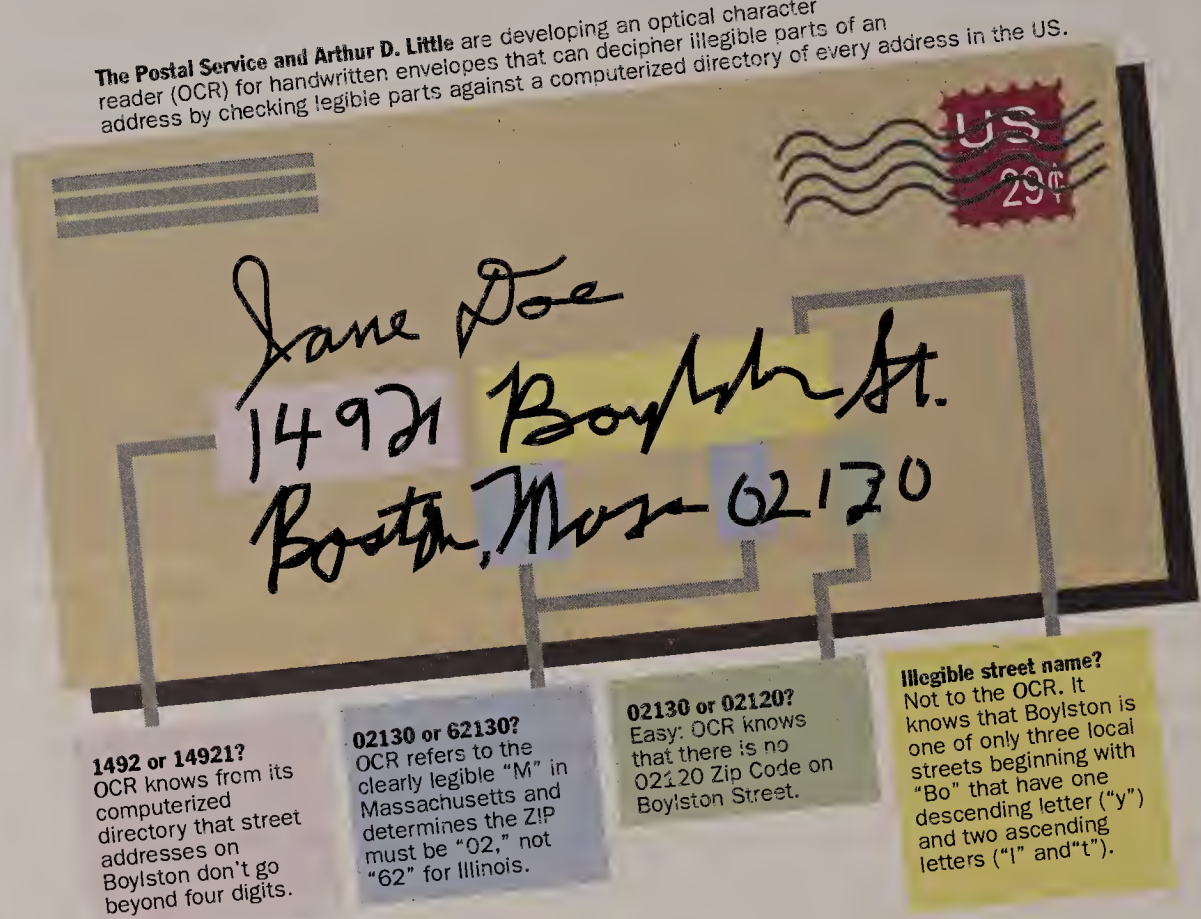
TRENDLINES

POSTAL SCANNER

Decipher Deletter, Desooner Debetter

Within a few years, the U.S. Postal Service will be using an optical character reader designed to decipher handwritten addresses—even if much of the handwriting looks suspiciously like chicken scratches. The innovation is part of a continuing effort by Arthur D. Little Inc., of Cambridge, Mass., to make the Postal Service more efficient, according to a report in *The Boston Globe*.

The new OCR evaluates the entire address instead of trying to read one character at a time. Each scanner contains a directory of all the addresses in the United States (this is made possible by ADL-developed data-compression software). The scanners decipher illegible parts of an address by comparing the legible parts against the directory.



The Postal Service and Arthur D. Little are developing an optical character reader (OCR) for handwritten envelopes that can decipher illegible parts of an address by checking legible parts against a computerized directory of every address in the US.

ILLUSTRATION REPRINTED COURTESY OF *THE BOSTON GLOBE*

New Ventures

Dave Norton, co-founder of the Boston-based IT consultancy Nolan Norton & Co., has joined the ranks of Bay State entrepreneurs. In early March, Norton departed from the firm he launched in the early 1970s (and sold to KPMG Peat Marwick five years ago) to start up a new firm that will focus on "the need for renewal in the IT profession." (Dick Nolan left the firm a year ago to join the faculty of the Harvard Business School.)

The new firm, Renaissance Strategy Group, located in Lincoln, Mass., will address the role of the IT profession in a period of change and turmoil.

"When we founded Nolan Norton, IT was an emerging profession," Norton said. "We focused on helping to build [its] identity.... But now the profession has come full circle" and faces a barrage of complaints about costs, delivery time and effectiveness. "We want to focus on renewal of the profession. We'll look at such things as the IT organization of the future."

Norton said the new firm will "work in joint teams with clients so that all the learning doesn't go back to the [consultancy]. We also want to use technology—specifically such things as teleconferencing—to change the economics of the business."

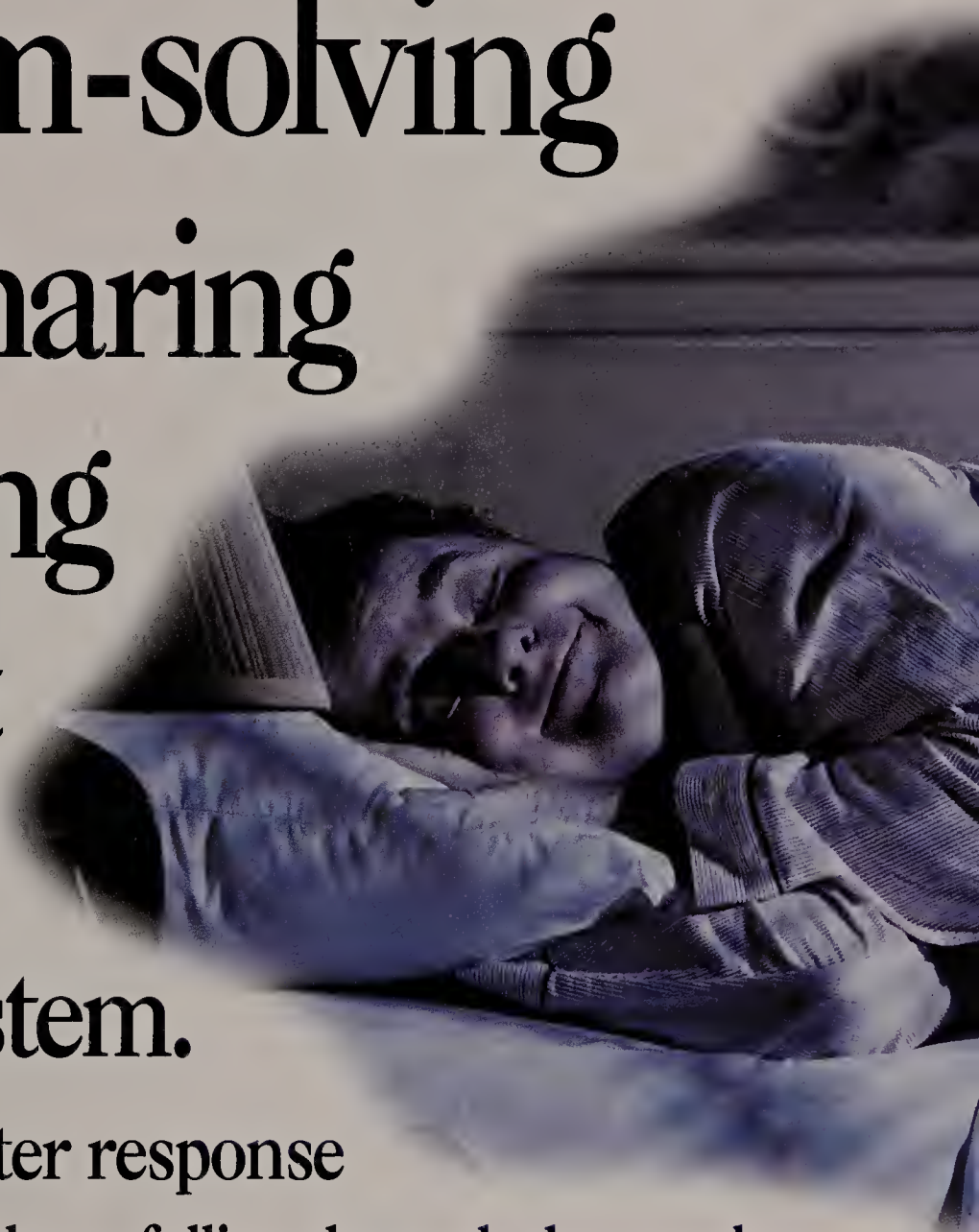
Norton insists that the break with Nolan Norton was amicable, and he said he will continue to work with them on select accounts as an outside partner. The Renaissance Strategy Group can be reached at 617 259-8833.

Vendors for the Environment

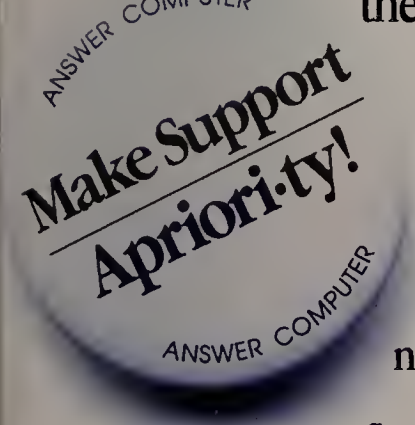
For a change, Northern Telecom is not in the news for global networking, but for global environmentalism. The company has made available a proprietary test apparatus that will help countries around the world speed development of manufacturing processes that do not harm the ozone layer.

Northern Telecom's board-dusting device tests the cleanliness of electronic circuit boards after completing a manufacturing process that uses no chlorofluorocarbons (CFCs). CFCs have been found to deplete the ozone layer that shields the earth from the sun's harmful ultraviolet rays. The technology has many applications in the manufacture of sophisticated electronics products. Northern Telecom is the first large electronics manufacturer to eliminate CFCs from its manufacturing processes worldwide.

Introducing Apriori: The problem-solving knowledge-sharing cost-containing call and support management so-you-can-rest system.



So your boss says, "I want faster response to users' calls. And no more problems falling through the cracks. And get your new people up to speed fast. By the way, we've got to tighten our belts again this year. Have a nice weekend." Believe it or not, you can do it all, with Apriori, the first complete call and problem management system. According to believer J.C. Penney, Apriori helps solve 95% of problems on the first call. (One support group reached 85% in just four weeks.) And at Interleaf, 40% more calls are being answered. With the same staff. Further, Apriori's "learning" and knowledge-sharing database brings new people up to speed, immediately! So call 1-800-677-2679 to find out how. Now. Then rest easy. And have a nice weekend.



ANSWER
COMPUTER, INC.

Some Apriori users from A to Z: • Answer Computer • Bell Northern Research • Cadence Design Systems, Inc. • ESRI • General Electric • Motorola • Triad Systems Corp. • Zycad Corp.

© 1992 Answer Computer, Inc. 1263 Oakmead Parkway, Sunnyvale, CA 94086. Apriori is a registered trademark of Answer Computer, Inc. Other company names are trademarks of their respective holders.

IS your mainframe on

Mainframes.
We all bought them.
Corporate jewels.
Engines of the intellect.
The big iron.
Rows of blue boxes
in glass walled palaces
cold as meat lockers.
(No wonder we got goose bumps.)
But now we're reconsidering.
(Do your computers have a job description?)
There are new ways to do old jobs.
And new jobs we never dreamed of.
So we're rethinking the roles
that these highly paid machines
should play in our companies.
(We need them to work harder, too.)
Oh, they're smart enough.
And they're here to stay.
You just have to point them in the right direction.

Dun & Bradstreet Software can retrain all your computers (from the biggest to the smallest) to do their jobs better than ever before. And to work together like they've never done before.(Listen. Someone's at the door.)

D&B SOFTWARE

Dun & Bradstreet Software

D&B a company of The Dun & Bradstreet Corporation

your **side?**

TRENDLINES

SPENDING STUDY

The Demographics of IT Strategy

Despite a national recession and shrinking corporate profits, IT executives across the country continue to spend on new technologies and new architectures, and they are slightly more optimistic with regard to IS spending this year than last, according to a recent survey by International Data Corp. of Framingham, Mass. Nevertheless, the 1992 U.S. IT Customer Directions and Spending Strategies survey, released last month, indicates that CIOs are spending conservatively and implementing new strategies with caution.

Based on 1,600 in-depth interviews with IS executives, the survey reveals that roughly half of the studied sites are investing in open systems, and about 30 percent are moving toward client/server architectures (although interest in both is low among users of IBM AS/400s and System/36s). Migration to more-modern hardware and software platforms topped the list of important challenges CIOs face in 1992—higher than cost control, network integration and staffing.

LAN popularity has also grown among IS executives, who plan to include 60 percent of their PCs in networks by the end of 1992, up from 44 percent in 1991. Two-thirds of those LANs will be based on the Novell operating system.

The survey found a strong interest in workstations among IS executives, but a surprisingly low commitment to the Apple Macintosh, with over 90 percent of respondents choosing to standardize on DOS or Windows. Windows is gaining popularity among those surveyed—over 40 percent of their installed base of PCs will be running Windows by the end of 1992, up from 25 percent.

IS executives expect maintenance and application development to take up the greater part of their staffs' time in the coming year. With this in mind, they are working to improve their internal standards, procedures and technical skills. Despite CIOs' movement toward new technologies and platforms, however, training in these disciplines was not a pressing issue among respondents.

As information executives struggle to keep their costs under control, they are increasingly considering—but not so frequently taking advantage of—outsourcing. About 25 percent of the survey base is also considering or using systems-integration services.

Vox Unpopuli

A traditional staple of annual April foolishness is America's abiding love affair with hating the Internal Revenue Service. And yet the resilient IRS keeps doggedly behaving as though real affection might be within its grasp. Last year, for example, at IRS headquarters in Washington, a choir of IRS employees sang charming tax-lyric carols to late filers. Cute, but not quite lovable. For now, the IRS will probably have to settle for ease of use.

As this year's tax deadline comes and goes, a select population of taxpayers has filed its returns by telephone, thanks to a voice-processing system called TeleFile developed by Microlog Corp. of Germantown, Md. The system is being tested this year in Ohio.

To play, the eager filer merely dials a toll-free number from a touch-tone phone and enters W-2 data via the telephone keypad. The system calculates the refund due or the tax owed and informs the taxpayer of the amount. To be eligible, taxpayers must be single filers with annual incomes of less than $50,000—anyone who would file a 1040EZ paper form. In Ohio, that's approximately 1.2 million people.

For taxpayers, the touted virtues of TeleFile include a quicker turnaround on refunds (two to three weeks rather than six), the ability to complete the chore in an average of five minutes, and fewer errors in refund and tax computation. For its part, the IRS saves on the costs of data entry and tax processing.

TeleFile will undergo a second test in 1993. If everybody's happy with the results, the system could go national. Then maybe ease of use will deepen into love.

Call for Nominations

American Management Systems Inc. and the Graduate School of Industrial Administration of Carnegie Mellon University are seeking nominations for their Fifth Awards for Achievement in Managing Information Technology.

These awards are presented to senior IS executives who have made outstanding contributions to their organizations through the effective use of computer and communications technology. Nominations, which are due by May 15, are made by the CEOs and other top executives of the organizations. Nominees will be judged on the degree to which they have enhanced management decision-making capabilities, provided competitive advantage, delivered major efficiencies, improved management controls, reduced risks and improved service to clients and other business partners. Winners will be chosen in September, with awards presented in New York in November. For information on submitting nominations, contact Jan Dodson at AMS, 703 841-5830.

ILLUSTRATION BY FRAN O'NEILL

AT&T MEGACOM WATS OUTBOUND LONG DISTANCE SERVICE

Yes, your AT&T MEGACOM® WATS service with AT&T Mega Watch℠ strikes me as a good idea.

☐ Please contact me right away so I can take advantage of the free AT&T MEGACOM WATS installation I get for signing up now.

☐ I have some questions. Please send me more information about the service, savings and value of AT&T MEGACOM WATS and AT&T Mega Watch service.

To receive free installation and start-up charges, you must sign up for AT&T MEGACOM WATS by June 13, 1992 and accept installation by September 13, 1992. Other restrictions may apply. Call your AT&T Account Executive or 1 800 247-1212, Dept. RZ4X. Or return this postpaid card.

Name _____ Title _____

Company _____

Address _____

City _____ State _____ Zip _____

( ) Phone _____

Current long distance service $ _____

Average monthly outbound usage _____

AT&T

© 1992 AT&T

AT&T

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO 150 JACKSONVILLE FL

POSTAGE WILL BE PAID BY ADDRESSEE

AT&T
PO BOX 45038
JACKSONVILLE FL 32232-9974

"Memorial Day weekend, 1991. I was home, relaxing, having a good time. Little did I know that back at the office trouble was brewing."

Last year, lightning struck the air conditioning at Guinness America, Inc. headquarters. And even though nobody was around, when the building got too hot and the phone system shut down, an AT&T Mega Watch℠ technician spotted the problem immediately. AT&T Mega Watch is an exclusive AT&T MEGACOM® WATS service. Our technicians monitor your phone equipment and T1.5 circuits, spotting trouble before you can, and coordinate repairs. The service gives you one contact for any network *and* equipment problems that may impact your AT&T MEGACOM WATS service.

Thanks to AT&T Mega Watch, a repair technician was at Guinness headquarters early Tuesday morning, and they were back in business by 10:30 A.M.

AT&T Mega Watch is one of many striking ways that AT&T MEGACOM WATS can give an edge to businesses that use at least $3,000 per month in outbound long distance.

And all the technology, service and innovation are in addition to the deep discounts of AT&T's biggest WATS savings plan.

*What's more, if you sign up by June 13, 1992, we'll waive the installation and start-up charges, which average $2100.**

So call your AT&T Account Executive, 1 800 247-1212, Dept. RZ4, or return the coupon today. The more your business depends on outbound long distance, the more your business needs AT&T MEGACOM WATS.

**Installation must be accepted by September 13, 1992. Customer must maintain service for six consecutive months with minimum average usage of $1,900 per new Account Number. Other restrictions may apply.*

☐ Yes, your AT&T MEGACOM® WATS service with AT&T Mega Watch℠ strikes me as a good idea. Please send me more information, today.

Name _____ Title _____

Company _____ Telephone number ( )

Address _____

City _____ State _____ Zip _____

Current long distance service _____ Average monthly outbound long distance usage $

To receive free AT&T MEGACOM WATS installation and start-up costs you must sign up by June 13, 1992 for installation by September 13, 1992.
Other restrictions may apply. Call your AT&T Account Executive or 1 800 247-1212, Dept. RZ4 or mail this coupon to AT&T, P.O. Box 45038, Jacksonville, FL 32232-9974. Or, if you prefer, fax it to 1 800 248-2492.

AT&T

© 1992 AT&T

AT&T MEGACOM WATS OUTBOUND LONG DISTANCE SERVICE

TRENDLINES

CIO CONFERENCE ROUNDUP

SQUEEZING VALUE FROM IT

Considering today's tough business climate, it's little wonder that the most recent CIO Perspectives Series conference drew an attendance of nearly 600. The theme of the conference, held March 8-11 in Coronado, Calif., was "The Business of IT: Finding the Payoff." Speaker after speaker shared their experiences and offered practical advice on ways in which CIOs can add value to their organizations through the strategic use of IT.

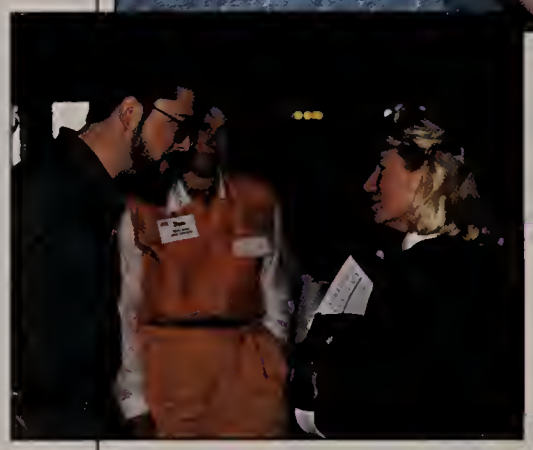
Management guru Peter Drucker delivered the keynote speech, exhorting CIOs to assume a leadership position in their organizations. According to Drucker, the information age will transform future organizations—stripping away layers of management and displacing the traditional motivators of pay and promotion. Jobs will be enriched by technology, necessitating that the CIO educate other executives about "information responsibility."

Drucker believes that CIOs are currently dealing with issues that will be rendered irrelevant by this future business environment. IS executives must take a proactive stance—asking management what information the company needs and uses. They should also concentrate on what information employees will need to do their jobs. Drucker said that the major challenge facing CIOs is how to integrate "outside" information into their internal information systems to make it useful to employees.

Professor James C. Wetherbe of the University of Minnesota's Carlson School of Management touched a nerve when he warned audience members against getting carried away with ROI. According to Wetherbe, CIOs who are trying to put a dollar value on IT are missing the point and probably wasting their time.

"Technology shouldn't primarily be used to reduce costs," he said. "The payoff of IT is primarily effectiveness and secondarily efficiency. If the application helps you better achieve who or what you want to be, then it's justified."

Patricia Wallington described how she got IT on the strategic agenda at Xerox Corp. Among her suggestions for CIOs who want to form partnerships with executives: Take a customer's perspective, contribute to the strategic vision, avoid technobabble, and spend at least 60 percent of your time communicating with peers and customers.



Conference-goers relax (above). Speakers included **PATRICIA WALLINGTON** *(left) and* **PETER DRUCKER** *(lower left).*

Attendees were also treated to a corner-office perspective on the payoff of IT. Fred Rosen, who as CEO transformed Ticketmaster into a $1 billion company, delivered this blunt message: "If you don't have good systems, no one will listen to you." Rosen said that at Ticketmaster, the key to success is using the smallest possible systems in order to maximize efficiency.

Arthur P. Stern, retired president of Magnavox Advanced Products & Systems Co., outlined a path for CIOs who want to make it into top management. "Any industry of any size needs information technology," he said. "CIOs are in a position to leverage manufacturing, human resources, marketing and all aspects of the business."

Nearly every speaker emphasized the importance of "people" skills over technical ones. Many awarded the highest priority to communicating effectively by speaking the same language as business managers. "Establish self-directed teams" was another frequent piece of advice.

Other speakers included Jack Cooper, vice president and CIO of Joseph E. Seagram & Sons, who discussed IT's role in building market share; Nigel Brooks of American Express, who talked about the CIO's role as a strategic business partner; and Max Hopper of American Airlines, who focused on the myth of IT as a strategic weapon.

At least one myth was debunked during the conference—that it never rains in Southern California. For those who couldn't make it to Coronado, and those who did but were disappointed by the lack of sun, the next CIO conference will be held in Boca Raton, Fla., next October.

PHOTOS BY DEANN SHIER/HAWKINS PRODUCTIONS

QUALITY QUESTIONNAIRE

Academia needs your help. A researcher at City University of New York is asking for input from IS managers on how JAD, SLAs and other methods used to align IS with line businesses affect quality. Anyone wishing to contribute to this dissertation, which is being sponsored by the Quality Assurance Institute, must complete a short survey. Participants will receive a copy of the research findings in return for their support. For information, call Marianne Bays at 201 783-9233.

EIS II:

THE FIRST ENTERPRISE-WIDE SOLUTION.

Open systems, client-server computing and workgroups. These are the new definitions for enterprise-wide corporate computing. And EIS II is the software solution:

■ **Integrated applications.** Departmental solutions for sales, marketing and finance support rapid prototyping, applications distribution and bottom-line results.

■ **Easy-to-use power.** EIS simplicity through an easy-to-use GUI coupled with true data-driven analytical power for executives, managers and analysts.

■ **One unified architecture.** Client-server versatility open to major hardware platforms and operating systems - on stand-alone PC, LAN, mini or mainframe.

■ **The bottom line.** Better information enterprise-wide, the tools to use it more profitably and lower support costs. That's why EIS II is the fastest-growing corporate computing solution.

EIS II

Call **1-800-765-7227** for a free EIS II Information Kit (**416-221-2100** in Canada).

information resources inc
SOFTWARE PRODUCTS GROUP

©1992 Information Resources,Inc., Software Products Group, 200 Fifth Avenue, Waltham, MA 02154

Profiles in Management

Today's IS executives are generally well paid, well satisfied and well disposed toward client/server technology and reshaping business processes, according to a survey by SIM

BY EDWARD R. MILLS

Last year, IS executives watched uneasily as the recession took its toll on staff increases and capital expenditures. But not all the news was bad, according to a survey by the Society for Information Management (SIM). In 1991, senior IS executives, and especially CIOs, were better educated and better paid than they had been two years before. While budgets remained tight, advances such as client/server technology provided new opportunities for IS executives to better serve their internal customers through distributed computing. And although the survey reported a decline in the overall level of job satisfaction, more than three-quarters of respondents said they are still happy with their careers in IS.

The survey was mailed to 1,900 SIM members last summer; 580 responded, including 445 whose job title identified them as senior IS executives.

Client/server topped the members' list of important technological advances, reflecting the increasing number of organizations that are moving toward distributed computing. EDI ranked second, with particular enthusiasm exhibited by the manufacturing sector. Surprisingly, optical disks ranked third, barely edging out the more pervasive and mature CASE.

On the management side, respondents indicated that the most important issue they faced was reshaping business processes. IT has become so pervasive that many believe it is the key to managing change and improving the way companies do business.

Quality Initiatives

Quality programs go hand-in-hand with business-process redesign, so it is not surprising that respondents gave high marks to such initiatives. Fifty-eight percent of SIM's respondents indicated their organizations already had companywide quality initiatives in place, aimed at increasing customer satisfaction, enhancing productivity, reducing costs and improving employee morale. However, the prevalence of quality initiatives varied widely by industry: More than two-thirds of the health, manufacturing and transportation organizations included in the survey had formal efforts underway; that number dropped well below half for wholesale, retail and educational organizations. Improved service, rather than product quality, was the most frequently mentioned objective of quality efforts, while only 7 percent of respondents cited cost reduction as their prime motive.

Half of the executives surveyed viewed their IS organizations as participants in quality initiatives; only 13 percent said their organizations held leadership positions in the quality drive. Ironically, IS is well-positioned to assume a leadership role, due to its cross-functional nature and ability to expeditiously provide information and analysis. This paradox will continue to stir debate as

Trends

IS executives:

- See client/server as the most important technological advance
- See reshaping business processes as the most important management trend
- See the role of IS in quality initiatives as one of participation rather than leadership

Traits

IS executives:

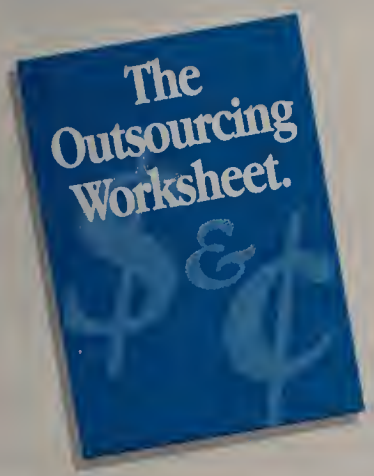
- Have seen their salaries rise 12 percent since 1989
- Are 11 percent more likely to have an advanced degree than in 1987
- Have been with their current organizations for 12 years

The Truth About Outsourcing.

When you first look at outsourcing, you may think it's cheaper to manage your own data network. But be careful. Beneath the base costs of leased lines, there are many hidden costs associated with doing it yourself. Costs like employee expense, equipment maintenance fees, depreciation and rental charges, network management software and datacom staff training. Just to name a few. When you add it up, doing it yourself isn't such an inexpensive idea.

Outsourcing with Cylix eliminates the unknowns of managing your own data network. Not to mention the cost of wasted time when something goes wrong and the phone company and equipment vendors give you the runaround.

With Cylix, you don't have those problems, because we manage your data network for you. We order, install, manage and maintain all modems, DSUs/CSUs, and leased lines. We provide a minimum 99.5% network availability and an average Mean Time To Repair of under four hours. All for one monthly fee that will save you at least 10% on the operating costs of trying to do it yourself. Figure out for yourself how much you can save by outsourcing with Cylix. Get *The Outsourcing Worksheet* and *Questions and Answers about Outsourcing* by calling 1-800-234-2954.



Cylix® COMMUNICATIONS CORPORATION

The Data Network Experts.

A subsidiary of France Câbles & Radio

800 Ridge Lake Boulevard, Memphis, TN 38120-9404 Phone 901-761-1177

©1992 Cylix Communications Corporation

IS organizations become more involved in reshaping business processes and quality initiatives, and as distributed computing-client/server technology becomes more prevalent.

Staff and Capital Expenses

IS staff increases were hard hit by the recession, with a meager 2 percent average increase reported for 1991 and an increase of only 3 percent projected for 1992 and 1993. Staff increases for 1991 were larger for smaller organizations; companies with IS budgets over $100 million projected an average 1 percent decrease in 1992 and 1993, indicative of both the enormous competitive pressures facing larger organizations and their potential for consolidating operations and reengineering business processes.

IS capital expenses grew almost twice as fast as staffing, and this trend is expected to continue for the next two years. Interestingly, executives appeared to foresee an end to the current recessionary period as their projections for the next two years indicated increases of more than twice the current growth rates.

As expected, the recession hit IS organizations in the Northeast hardest, while those in the West were affected very little. Respondents from two cities in particular—Boston and Detroit—projected an overall decrease in actual 1991 IS budgets. Companies in Philadelphia and Los Angeles expected the largest IS capital increases.

Budgets

While the percentage of revenue expended on IS varied widely by company and industry, some clear trends emerge when the numbers are broken down by company size. Firms with revenues under $250 million spent an average of 2.5 percent of revenues on IS; that figure drops to 1.5 percent for companies in the $3 billion to $5 billion range. This too can probably be attributed to economy of scale, consolidations and intense efforts by many of these firms to redesign business processes.

Education

The number of IS executives who have earned an advanced degree climbed 11 percent in four years, reflecting a growing need within the industry for business skills to complement technical capabilities. (Seventy-one percent of respondents held advanced degrees in 1991 as compared to 59 percent in 1987.) The correlation between advancement and education became even clearer when the sample was broken down by title: 83 percent of CIOs had advanced degrees versus 74 percent of corporate/executive/senior vice presidents and 64 percent of directors.

Salary Levels

The average salary for IS executives in 1991 was $120,305, a 12 percent increase over 1989. Those holding the title CIO who were employed

BIG QU

When your customers buy better

EDS helped Apple Computer answer yes.

In the rush to market, how can you beat the competition without compromising product quality? Using a **new application** of information technology, Apple Computer now distributes engineering diagrams to all of its manufacturing sites in seconds, via a global electronic network. EDS helped Apple develop this system using the latest imaging technology.

This **speeds the development** of products by eliminating the possibility of errors caused by out-of-date engineering drawings.

Jackie Streeter, Apple worldwide product configuration manager, says, "If people have the right information

EDS is a registered trademark of Electronic Data Systems Corporation. © 1992 EDS

by companies with IS budgets exceeding $100 million earned the most, with average salaries of $239,773 (a 16 percent increase over 1989 figures). But comparisons of IS executive salary levels between 1989 and 1991 also showed a slowing in the rate of salary increases for older, higher-level IS executives.

IS executives in the finance, insurance and real-estate industries reported the highest earnings, with an average salary of $138,889. The health-care industry had the second-highest average with $124,265, followed by manufacturing companies with an average of $122,973.

IS executives in companies with IS budgets under $20 million have not fared as well: CIOs' salaries increased a scant 5.5 percent, while vice presidents' salaries actually dropped by 3 percent. By region, the average IS executive salary was $133,000 in the Northeast, $117,000 in the Midwest, $112,000 in the West and $109,000 in the South.

Career Satisfaction

Despite the downsizings and layoffs brought on by a recessionary year, a clear majority (79 percent) of respondents said they are satisfied with their careers in information systems. (In 1989 that figure was 85 percent.)

While most respondents reported that they were satisfied with their career choice, 70 percent said they had not achieved their career goals. Although a large number, this statistic is down from 1989, when 76 percent of IS executives were still striving to reach their objectives. When broken down by title, CIOs were shown to have made the most significant gains: Last year 30 percent said they had achieved their career goals, up from 20 percent in 1989.

Not surprisingly, IS executives who have so far failed to achieve their goals were significantly more pessimistic about the prospects in their present firms. Only 36 percent of these respondents feel they are likely or very likely to achieve their goals under their current terms of employment—down from 56 percent in 1989.

Tenure

IS executives indicated that they have been with their current organizations an average of 12 years, up 20 percent from 1989. This slowing of movement among IS executives may be another symptom of an uncertain economy. Respondents with the title CIO said they had been employed by their present organizations for eight years (up from seven years in 1989) and had held their present positions an average of five years. Only 18 percent of respondents reported having held their current positions for eight years or longer. CIO

Edward R. Mills is vice president of systems and operations for the U.S. Committee for UNICEF, and a member of SIM's Member Communications Committee.

ESTION:

products, will they come from you?

at the right time, they can make better-informed decisions, which translate into **better products, sooner**."

Using Macintosh computers, Apple employees worldwide can call up engineering diagrams, which they can enlarge, reduce, rotate, or reconfigure to fit with other components. Last fall, the system helped Apple introduce six new products simultaneously, and **ahead of schedule**, helping maintain Apple's reputation for setting new standards.

Changes in technology create business opportunities. You can use information technology to develop new products, improve quality and shorten time-to-market. To learn more, contact EDS, the world leader in applying information technology. Write Barry W. Sullivan, Director of Marketing, EDS, 7171 Forest Lane, CI2, Dallas, TX 75230. Or call (214) 490-2000, ext. 302.

EDS

TAKE ADVANTAGE OF CHANGE℠

The basic one-year subscription rate for *CIO* magazine is $94.

Subscribe And Save. $~~94~~ $59

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only $59, a savings of over 37% off the basic rate.

Name _____

Title _____

Company _____

Address _____

_____

City _____ State _____ Zip _____

**This is a domestic rate only (Canada & US). The foreign rate is $175 US.*

492

PROCESS IMMEDIATELY

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900

INTIMATE TECHNOLOGY, *And All That Jazz*

PC visionary Alan Kay riffs about the barriers to widespread computer literacy, the need for a new interface metaphor, the legacies of Martin Luther and Aldus Manutius, and why we don't need more Cobol programmers

BY MEGHAN O'LEARY

One of the better-known little-known facts about Alan Kay is that he is an accomplished classical and jazz musician. He is probably best known as one of the founding scientists at Xerox's Palo Alto Research Center (PARC), where he helped to develop the building blocks of the modern personal computer interface. Today he is a research scientist and an Apple Fellow at Apple Computer, where he studies interfaces between computers and humans—most notably children. He is a visiting professor at MIT and a speaker on education and technology who draws SRO crowds. His latest project is a research venture with the Index Group of Cambridge, Mass. Called Vanguard, the service will explore the future business impact of emerging information technologies for some 50 subscriber companies.

ALAN KAY talks more like an historian than a technologist. He speaks often of the "messages" behind new technologies, and their eventual impact on users and society in general. His speech is both casual and scholarly, straightforward and liberally sprinkled with allusions to philosophers, poets, scientists, educators and his own peers. He seems to hold them all in equally high regard.

In Kay's view, the biggest obstacle to propagating computer use and literacy is that most people's understanding of computers is still buried in

PHOTOS BY LOIS GERVAIS

the past. "[Marshall] McLuhan pointed out that every time a new medium comes along, the content is initially taken from the old medium," said Kay. "The free spread of new technologies has always been hampered by people's inability to think about computers in new ways."

He illustrates this cultural bottleneck by describing three revolutions in computing—two past and one yet to come—and their effect on user interfaces. The first was the mainframe shift from batch processing to time-sharing. "When time-sharing came along," he said, "all of a sudden the number of people who could use the machine widened to a much larger group, but they had to do lots of training because the job of the user interface" was that of a control panel that gave programming experts access to functions without instruction.

The second revolution was the invention of the personal computer and a subsequent new user interface that had to be helpful as well as efficient. "The question was, are you really going to try to change millions of people to use this thing that was formerly used by just a few hundreds of thousands? Our answer was no." Kay and his cohorts decided that the user interface needed to become a learning environment that could interactively instruct PC users, as it does on the Macintosh.

Useful as it is, the learning environment still requires the user to learn and perform many tasks that could be automated. With this in mind, Kay predicts a third revolution, of which he is the chief fomenter: that of pervasive networking, in which the computer presents a user interface that can teach itself to do what the user wants.

To illustrate the concept of pervasiveness, Kay points to that most common of business tools, the telephone. "One of the things you can do when you talk about networks is to diagram them; that's something people never do with telephone networks because every telephone is connected to every other telephone on earth," he said. During the Gulf War last year, Kay surprised a conference audience in San Francisco by dialing up Baghdad on a cellular phone in the middle of a session. "The pervasiveness was that I didn't have to go find a phone."

The pervasive generation of computers that Kay heralds will be eminently portable, intimately personal and ultimately connected. He believes that pervasive networking will bring about several key changes in computing. The first—which is already happening—is that "personal" computers will shrink to notebook size.

Kay links the ongoing miniaturization of computers to a similar trend begun in the 15th century by Aldus Manutius, a Venetian book printer who lived during Gutenberg's time. "Aldus decided a book should be this size," he explained, holding up a notebook, "because that was the size of saddlebags in Venice." Manutius understood that the real impact of the printing press was its ability to make books intimate, not just to automate the printing of them. According to Kay, "the computer is still sort of in a Gutenberg phase, where the printing press has been invented" but no one has yet realized the possibilities of intimacy.

Kay has been interested in the shrinking of computers since 1968, when he read physicist Gordon Moore's paper on the future of silicon. Moore made remarkably accurate 30-year projections for the density, speed and cost of silicon chips. With the example of Manutius, Kay became interested in how silicon would change computers. When Kay saw his first flat-panel display, he began thinking of personal computers as a pervasive medium—cheap, easily portable and ubiquitous—whose use should be extended into childhood. Kay calls these intimate computing tools "Dynabooks."

"There were sociological and anthropological and psychological and historical reasons for getting a computer into the intimate size that Aldus thought a book should have," said Kay. "That's why I called it a Dynabook, because I didn't want people to think of it as a computer. I wanted them to think of it as something with the intellectual span [of a book]."

Kay believes that pervasive networking will require a new interface metaphor. "The limits of the [icon-and-mouse-based] interface are good for a few hundred [objects]," he explained. "Now imagine the Macintosh in which the finder has a trillion objects [to search]. At some point, the whole metaphor breaks down, just as it does when you go into the Library of Congress and the card catalogue is larger than your whole hometown library. Most of us believe that when you're dealing with that many resources, any hand-tool metaphor [like a mouse] is not going to work. So you're going to require something that's like the people in the Library of Congress who try to find out what your [research] goals are, and then can work on your behalf even when you're working on other things." Kay calls these electronic functionaries "agents."

At trade shows, Apple often screens

a video, called *Knowledge Navigator*, about a very capable agent that can coordinate a variety of tasks around a goal, from appointment setting to research. That level of agent interface is years away and will rely heavily on developments in artificial intelligence that will allow it to model human goal structures. In fact, the need for agents is likely to force AI from its decades-old imminence into common use, according to Kay. Nevertheless, what we are more likely to see in the next five years is a number of simpler agents.

> *"Marshall McLuhan pointed out that every time a new medium comes along, the content is initially taken from the old medium. The free spread of new technologies has always been hampered by people's inability to think about computers in new ways."*
>
> *–Alan Kay*

Kay predicts that pervasive networking will also have a profound impact on our understanding of computer literacy. "If you were faced with a job candidate [who] could read but could not write a paragraph, would you say that they were literate?" he asked. "You can't learn music or science without actually doing it, and the same is true of [computer] literacy."

Kay envisions a system that teaches users the basic structure of a program and allows them to choose from among a variety of boilerplate modules to help them construct their own programs. "If you think about it, when you're buying a software system that has 1,000 features, what you're buying is 1,000 paragraphs." The programming tools that Kay anticipates will allow users to choose from among thousands of "paragraphs" to create their own application programs.

The challenge is to shape these programming tools from a language that users can understand. Kay's inspiration for this task is 16th century German Reformation leader Martin Luther. Luther wanted to bring the Bible to the German people. His solution "was not to teach everybody Latin, but to enrich the German language so it could carry the philosophical plate of the Bible. I always thought of him as the first user-interface designer in the sense that he decided to start with something that was familiar to the people. He [enriched] it and actually began the language the Germans speak today."

Computing's equivalent to the German Bible would be an English-like language somewhere between the finished program and the code itself. Kay points to Apple's HyperCard as a tool that allows users to be literate in both directions. While he admires HyperCard, he points out that it is, "unfortunately, a pidgin language because it doesn't provide access to all the possibilities of a Macintosh.

"The way I think about it is, when you teach somebody English, you don't expect them to write a Shakespearean sonnet in order to prove [they're literate]. On the other hand, you're killing them if you don't teach them the same language that Shakespeare used. If they want to aspire to a Shakespearean sonnet or play, they should, by God, have learning tools that allow them to put in the extra work.

"What we *don't* want is for everybody to become a Cobol programmer," he said. "That's not going to help. So, like Martin Luther, we have to find that thing that's familiar enough to start with." In Kay's view, there are already better languages of literacy than HyperCard: NeXT's NeXTStep and Digitalk's Look-and-Feel (LAF) Kit (which Kay calls "the best I've ever seen").

Kay's ideas on computer literacy and pervasive networking are better known among scientists than in the user community. Still, he points to spreadsheets, desktop-publishing systems and HyperCard as examples of systems that let the user tailor applications. "You could say it's the start of literacy when you're imposing some of your will and your goals on the computer. And what happens when everybody is walking around with these electronic things and, . . . for the first time ever, it is not stupid to put your grocery list on the thing. . . . What will users' programming needs look like then?"

While he waits for the answer to that question, Kay continues to be part scientist, part visionary and part evangelist. "In a perfect world, I'd like to do what I did at Xerox PARC, which was almost pure thinking up neat things and trying to get them built—plus lots of tennis and music. But that didn't work well at Xerox.... Xerox was a great lesson for all of us, and that was that you can't go off and do something really innovative" and expect people to be ready for it. CIO

SOFTWARE AG Guarantees To Cut Your Application Development Time In Half...

...Or It's FREE!

Years of application backlog are cutting into your productivity and responsiveness. Let SOFTWARE AG help you take charge of the situation – with guaranteed results! Together, we'll develop a working application in half the time, or it costs you nothing. And you can count on SOFTWARE AG to stand behind our word. We'll even put it in writing.

There's no fine print; no gimmicks; no vaporware. Our Rapid Application Development (RAD) techniques simply let you regain control of your development schedule. Period. These proven procedures will help you eliminate your backlog – double your productivity – and improve the quality of your applications. All in half the time it normally takes to develop an application specifically designed to meet your user's demands.

Best of all, you've got the security of The SOFTWARE AG Guarantee. If we can't deliver a working system in half the time, simply return the tools at no cost to you. There's absolutely no risk, and the bottom line benefits make it impossible for you not to call right away. You've got nothing to lose – except your backlog.

To find out more about The SOFTWARE AG Guarantee and to receive your free copy of our complete RAD Implementation Kit, call today: 1-800-843-9534, Ext. 700.

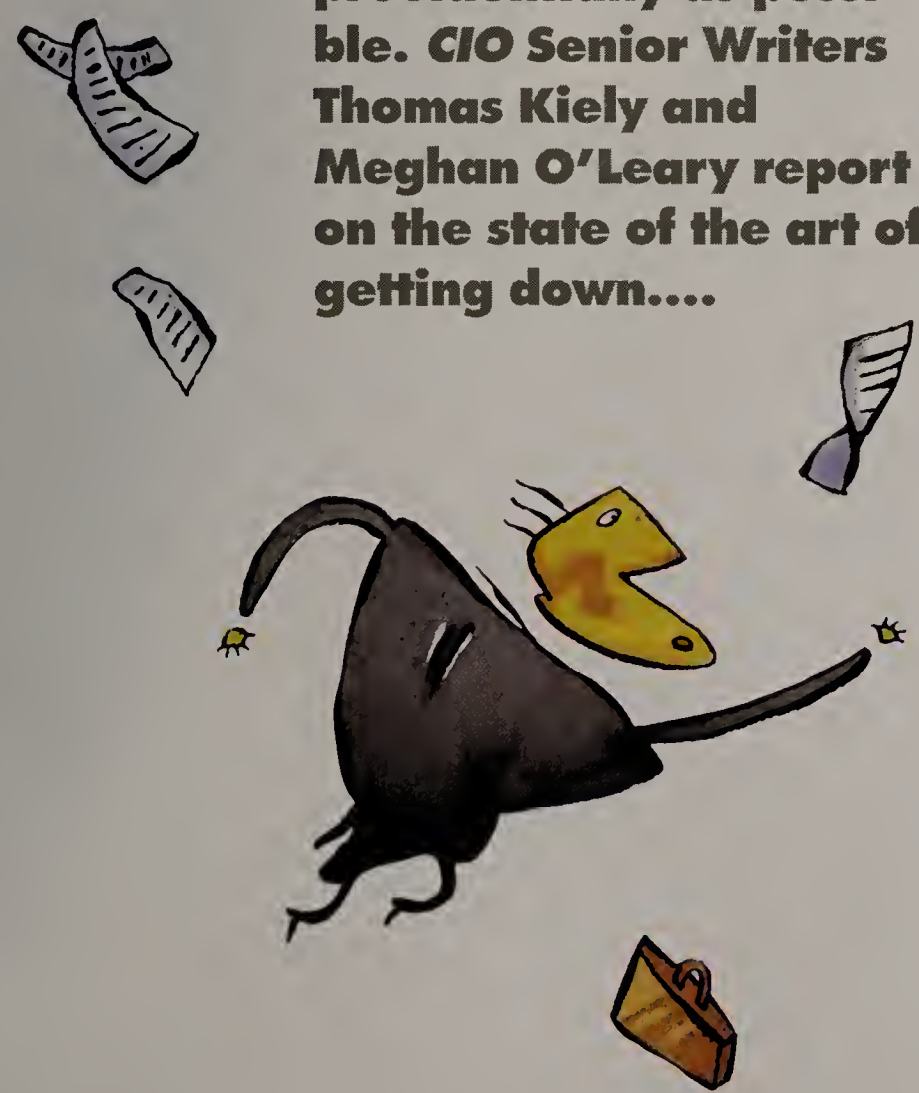
To Receive Your Free Copy Of SOFTWARE AG's Complete RAD Implementation Kit, Call: 1-800-843-9534, Ext. 700

SOFTWARE AG
SOLUTIONS WORLDWIDE

DOWNSIZING

HOW TO MAKE IT IN A SMALL WORLD

The truth is that few CIOs are big downsizing enthusiasts. They are suspicious of overhyped benefits, mindful of hidden costs and daunted by the challenges of managing and supporting far-flung LAN-based platforms. But CIOs are also realistic enough to know that the technology world is trending both down—to smaller boxes—and out—to the user community. The trick is to manage these related trends as wisely and providentially as possible. *CIO* Senior Writers Thomas Kiely and Meghan O'Leary report on the state of the art of getting down....



Ins and Outs
Experienced downsizers can rattle off lists of glitches and tradeoffs. The uncertainty makes CIOs wary. "The jury is still out on downsizing," says Texaco's James Metzger. "More questions are being asked about it than answers are being supplied."
PAGE 34

Hearts and Minds
Downsizing inevitably brings about a culture shock. How can CIOs mitigate the shock and make sure that change is manageable and constructive?
PAGE 44

Nuts and Bolts
"I reject mainframers' contention that it is easier to maintain security of data in the mainframe than in distributed [networks]," says NCR's Jim Hull.
PAGE 48

Means and Ends
A Cleveland metallurgical firm is downsizing as an outgrowth of its quality-driven reengineering effort.
PAGE 54

DOWNSIZING

KEEPING UP WITH THE INS AND OUTS

There are no perfect solutions, but CIOs testing the downsizing waters are discovering that this strategy is an unusually mixed bag of payoffs, tradeoffs and unanswered questions

BY THOMAS KIELY

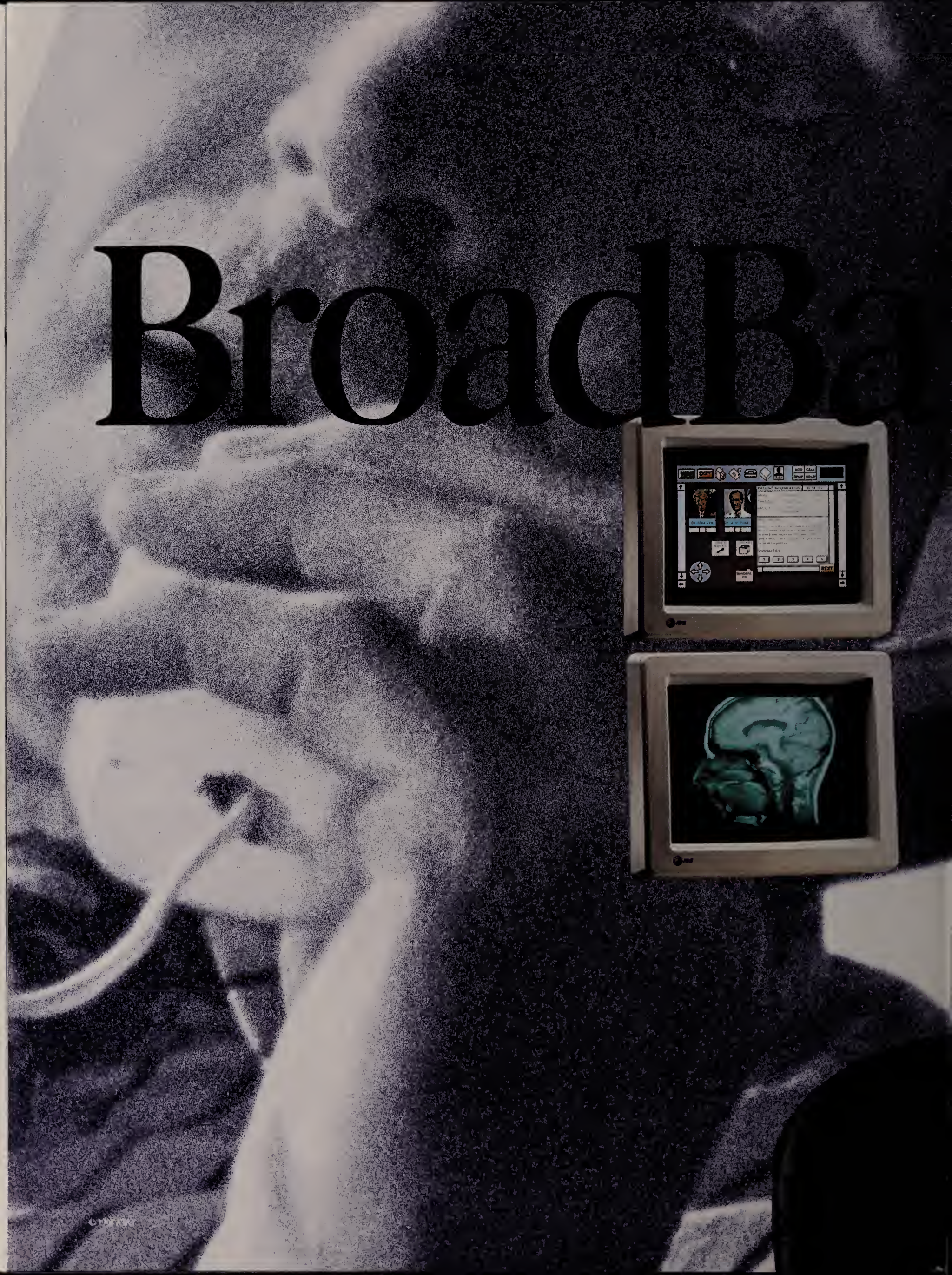
Downsizing won't win any popularity contests with CIOs. The strategy of replacing mainframe applications with solutions running on smaller, less expensive processors has many supporters among the ranks of consultants and vendors, but you would be hard pressed to find a CIO who is a downsizing evangelist, and many are outright skeptics of the trend. Even CIOs who have downsized will tell you that the cost savings from the move are deceptive, the management issues problematic, and the technology not without drawbacks.

But downsizing may prove to be an instance of the cart leading the mule. Frank Michnoff, program director for desktop computing strategies at the Meta Group, in Westport, Conn., notes that downsizing is the consequence of "the MIS squeeze." On one side are end users who want more functionality—and want it now. On the other are CEOs and CFOs who want IS to spend less providing that functionality. Caught in this vise, CIOs are taking a good close look at downsizing to see if it holds any promise.

More downsizing is going on than people realize. That is a

PHOTO BY JAMES SCHNEPF

RICH KOLBE: HARLEY DAVIDSON ENCOUNTERED PROBLEMS IT NEVER ANTICIPATED.


BroadB

Leader

Or, Why Broadband Services From Your Local Telco Will Be Music To Your Network.

Broadband services unleash the true power of the public switched network. Let networks of computers listen and talk. Allow you to bring up a remotely stored document in one window. Video conferences in two others. How? By using cell relay, fast packet switching, it allows existing public networks to transmit more information at faster speeds. So things impossible now, will be possible tomorrow with broadband. High-definition television. Interactive education. Image processing. High-resolution faxes. To learn exactly what broadband services can do for you and your business, talk to the broadband leaders. Call your local phone company or AT&T Network Systems at 1 800 638-7978, ext. 6110.

AT&T and Your Local Phone Company. Technologies For The Real World.

AT&T
Network Systems

DOWNSIZING

MOST COMPANIES ARE DIPPING THEIR TOES INTO THE downsizing waters through carefully selected pilot projects. The watchword, observers agree, is caution.

surprise uncovered in a survey conducted recently by Input, a market-research firm based in Mountain View, Calif. While Input is still assessing the information gleaned from an in-depth survey of 60 CIOs and 30 technology vendors, the firm says that respondents listed a wide array of applications they intend to downsize in 1992. "This is real," said Tim Tyler, a consultant for Input. "People are definitely moving in this direction."

It is a trend fraught with anxiety. According to Tyler, both the CIOs and the vendors he surveyed cited cost savings as the driving force behind downsizing—yet both sets of respondents doubt that downsizing will yield big cost savings. In general, respondents also believe that the mainframe offers better reliability and security than do PC LANs, and that there is better vendor support for mainframes. Vendors who were surveyed believe that downsized applications will improve the quality of information management. CIOs do not agree. "Nonetheless, they're downsizing," Tyler said.

Among companies that are downsizing, the majority are doing so gingerly. While a handful of organizations have decided to shoot their mainframes and leap headlong

---

Old Programmers, New Tricks

Creating a shiny new workforce for the downsizing company is an expensive process of hiring the new, retraining the flexible, and jettisoning the hopeless

Few programmers have the skills necessary for a downsized computing world, and not all programmers can be retrained. That conclusion was drawn from a survey of 50 IS managers conducted last summer by Forrester Research Inc., a market-research firm based in Cambridge, Mass.

In a report titled "Recycling Programmers," Forrester notes that programmers will need to improve their mastery of application-development tools (including CASE), relational and distributed databases, object-oriented programming, and designing for client/server architectures. These are the necessary skills for what Forrester calls new-world computing. But the IS managers surveyed estimate that only 28 percent of their current staff programmers have these skills; they consider another 58 percent retrainable. Alas, 14 percent of current IS staff—about 35,000 programmers nationwide—are untrainable "deadwood," according to the survey.

Forrester estimates that it will cost companies about $35,000 to retrain a programmer. This figure includes $25,000 in salary and benefits paid to a staff member who is nonproductive during four months of retraining, and an estimated $10,000 a head in training fees. For the average large company surveyed (with 218 programmers, 72 percent of whom will need retraining), that could mean shelling out $5.5 million to lead programmers into distributed pastures.

Forrester recommends that companies intending to leap into new-world computing undertake the following three-phase, five- to seven-year retooling program:

PHASE ONE:

- **Establish performance metrics that reward programmers for user satisfaction rather than lines of code written**
- **Reduce the backlog**
- **Cut maintenance**
- **Adopt new development tools**
- **Begin a few manageable client/server projects**

PHASE TWO:

- **Hire new programmers**
- **Ghettoize foot draggers (put them into the maintenance pool)**
- **Foster competition between new-world programmers and mainframe veterans**
- **Begin to push development into the business units**

PHASE THREE:

- **Boot the lingering resisters out the door**
- **Clean up loose ends**

The enormity of the problem seems daunting at first, said Neal Hill, senior analyst at Forrester. "But when you view it in a comprehensive way, it starts to become approachable. It's doable." **—T. Kiely**

into distributed processing—Harley-Davidson Inc. and Federal Guaranty Insurance Co. among them—most are dipping their toes into the downsizing waters through carefully selected pilot projects. The watchword, observers agree, is caution.

Companies have reason to be cautious. Downsizing boosters point to the price/performance differential between desktop machines and mainframes as a demonstration of the potential cost savings inherent in the strategy. And there are numerous downsizing success stories that lend credence to the hoopla. For example, Home Mutual Life Insurance Co., in Baltimore, replaced an ancient Honeywell mainframe with five PC LANs and is currently moving its remaining minicomputer-based applications to the LANs as well. The company will recoup its $480,000 migration costs in just over two years. And JFK Medical Center, in Atlantis, Fla., substituted a RISC-based network for its mainframe, reducing IS staff costs by 25 percent, gaining more patient-care space, and shaving hundreds of thousands of dollars in hardware and service costs.

But stories also abound of companies that have found the cost issues more complicated. Harley-Davidson, headquartered in Milwaukee, is halfway through a project to move from a mainframe environment to IBM AS/400s and LANs. But the company has encountered more technical and organizational problems than it had anticipated—and that has put it about 10 to 20 percent over budget. McKesson Water Products Co., in Los Angeles, will save about $2 million a year as a result of moving some business systems from a mainframe to AS/400s, but the move cost the company more than it had expected to pay. And a major Wall Street firm says that some downsizing projects implemented in the last few years have saved it money—but some have not.

Ronald Peri, president of Computer Support of North America, a downsizing service firm headquartered in Basking Ridge, N.J., says he isn't surprised by stories like these. In his estimation, swapping a mainframe for an AS/400 or moving to Unix-based platforms isn't downsizing. "I don't see any basis for cost savings there. The real cost savings is in moving to a PC environment," he said.

But questions remain in most CIOs' minds. "We are extremely familiar with costs on the mainframe side, but not very familiar with costs on the decentralized side," said James Metzger, general manager of information technology at Texaco Inc. in Houston, echoing the comments of many CIOs interviewed for these articles. The much discussed "hidden costs" of downsizing reflect the widespread unfamiliarity among IS executives with this new computing terrain.

Moreover, few CIOs are ready to ditch the trusty old mainframe in favor of machines that were, until a few years ago, mere toys. In many ways, the new technology must still prove itself—especially to IS executives in large, centralized organizations. CIOs also worry about coherence, compatibility, integrity and security. Computer Support's Peri argues that current networking technologies can address all these concerns. But experienced downsizers can rattle off a list of glitches and tradeoffs (see related story, Page 48). The uncertainty makes CIOs wary. "The jury is still out on

DENNIS MARGEL: "I DON'T SEE HOW I COULD LEVERAGE CLIENT/SERVER TECHNOLOGY FOR THE BUSINESS."

PHOTO BY MARK HOBSON

Our motto.

After all these years, we

Before we were known for computers or Nobel prizes or a blue logo, IBM stood for service. And we still do.

But today the need for service is different. Information technology has become so essential (and so complex), many companies feel it has taken them over. They're looking for someone to lighten the load so they can focus on what matters most, running their business.

So we've refocused, too.

IBM service is now a vast array of services, delivered by experts. Our help can range from broad

© 1992 IBM Corp

ve made one small change.

strategic planning, to systems integration, to network management and user training.

We can also provide total hardware, software and network availability services, not only by fixing problems, but by anticipating them before they occur.

If you're streamlining data centers, we won't just give you a hand, we can take them off your hands. Our ISSC subsidiary (which specializes in outsourcing and business recovery) is now managing several customers' data centers, lock, stock and barrel.

Or, if you're cutting costs selectively, we can handle many functions for you more cheaply than you can do them in-house, saving you headaches, too.

But it's not just what you save, it's what you gain. And that's why IBM services exist—to keep your systems (and the people who use them) at their best all the time. Technology may be your most critical investment, and we'll help you make the most of it.

No one else has IBM's kind of depth or IBM's kind of people, which makes us an ideal services choice. To learn more about how we can help you, call for our detailed services brochure. The number is 1 800 IBM-6676, ext. 760.

IBM®

downsizing," said Metzger. "More questions are being asked about it than answers are being supplied."

The problem is that downsizing (or "right-sizing," as some euphemists prefer to call it) is one ingredient in a larger stew, say several observers. Ultimately, downsizing is a path to distributed computing, client/server architectures, the reengineering of outdated business processes, new ways of managing information, new IS skills, and a new job description for the CIO (see related story, Page 54). The CIO can downsize select applications to get a feel for the consequences of the new technology, or dive into the new age like a parachutist—but costs and savings (and technology solutions) will be defined by the number of variables that are encountered between those two positions.

THE CIO CAN DOWNSIZE SELECT APPLICATIONS TO GET a feel for the consequences of the new technology, or dive into the new age like a parachutist—but costs and savings (and technology solutions) will be defined by the number of variables encountered between those two positions.

For example, the power control department at San Diego Gas & Electric Co. will soon replace two Gould minicomputers with a network. While swapping technologies won't save the company IS dollars, SDG&E is convinced that the added functionality—which it says will be dramatic—will allow it to fashion new applications that could help save a bundle.

Harley-Davidson, Home Mutual Life Insurance, NCR, Banc One and other companies have embraced downsizing for strategic purposes. "For several years we did very little in terms of keeping our systems up," said Rich Kolbe, director of MIS at Harley-Davidson. "So going forward [with systems modernization] was going to be painful no matter what we did. But we wanted to give tools to our users, and we looked for the most efficient tools at the right price. It's a big project, because we're also rethinking how to do the business at the same time."

Kolbe noted that Harley-Davidson will have a fully distributed platform when the project is completed. Managers using the company's new general ledger system are already converts to new computing; ditto the IS staff, Kolbe said.

Still others look at downsizing as one technology tool among many. Seattle-based Alaska Airlines may move its Focus-language databases to distributed processors in a bid to lighten the load on its mainframe. With capacity under control, the airline hopes to negotiate an attractive mainframe lease extension. Alaska Airlines "doesn't have a mission to downsize. This is a tactical measure to save money," said Bob Reeder, director of application development.

But many other companies don't see the fit—at least not yet. "I don't see how I could leverage client/server technology for the business," said Dennis Margel, director of information technology at Pennsylvania Blue Shield, of Camp Hill, Pa. Blue Shield is a highly centralized organization, Margel explained. While the company does have a newly written application running on a network (and is overhauling its communications network), he doesn't see how distributed applications can fit his company's business. But he continues to study the possibilities. CIO

Cost Considerations

The costs involved in downsizing often prove to be higher than anticipated, caution many CIOs who have downsized systems. Here is a list of costs to consider:

- **The cost of capital equipment, such as PCs and communications products, software, wiring, back-up solutions, etc.**
- **The cost of running parallel systems during migration**
- **Conversion expenses, including those incurred in hiring new staff**
- **Increased administration expenses during the migration**
- **Consultant fees**
- **The price of new tools for writing distributed applications**
- **The cost of retraining both IS staff and end users (most companies underestimate this item)**
- **Maintenance fees for multiple software packages in a distributed environment (these are often underestimated as well)**

WHEN 19,000 CAREERS ARE ON THE LINE

WHO DO YOU WANT STANDING BEHIND YOUR PHONE SYSTEM?

Forget ivy-covered walls and lounging on the grass. Today's students are rushing to meet the 21st Century. Libraries are now "multimedia buildings." Lecture halls are "instructional telecommunications centers," and laboratories are "applied technology facilities." At California State University, Fresno, there's even a special system to integrate all of these resources. It's called a telephone.

Actually, the students of CSUF call it the "super phone" – and rightfully so. By integrating all voice, video and data communications, this massive digital network provides access to thousands of on-campus computer workstations, telephones and telecommunications services. From the status of a starting freshman to the final grades of a graduating senior, the F9600™ system puts it all on the line.

To learn more about our super phone, just pick up your telephone. Call 1-800-553-3263.

The F9600 Digital Telephone from Fujitsu, a $21 billion global telecommunications leader serving over 100 countries.

FUJITSU

The global computer & communications company.

DOWNSIZING

HEARTS AND MINDS

There's no getting around the fact that downsizing equals culture shock. Inevitably, some percentage of souls will be shocked right out the door. But with careful planning, adequate support and creative persuasion, many souls can also be saved.

BY MEGHAN O'LEARY

With all the noise about the network management and security concerns associated with a downsizing effort, CIOs may not hear the whimpers of the users and IS staff around them. The fact is that downsizing, especially when it is part of a conscious reengineering effort, brings cultural change. This is true both for programmers and systems engineers, who must learn new management skills and use new software tools, and for users, whose jobs are often radically altered when they are given a powerful LAN and a GUI in place of a dumb terminal. CIOs who want to manage a downsized environment effectively must give workers the tools and support they need to make the transition.

The most obvious victims of change in a downsizing effort are mainframe programmers and systems analysts, many of whom must learn a new career discipline in order to stay on with a company that is abandoning the mainframe. Many choose to move on to "other programming opportunities" rather than adapt to a new environment. This was the case at Dyncorp, a diversified technical-services company in Reston, Va., where one-third of the programmers were so resistant to learning new skills that management offered them immediate severance instead. Another third were invited to stay through the conversion from mainframes to nine Novell networks and, as a result, received additional training to aid them in their imminent job hunt. Only the remaining third stayed on to be trained in their new discipline.

The change in IS skills is perhaps more radical than many people understand. Developers of downsized, decentralized systems tend to have more contact with users and to focus more on solving business problems than on writing code. John T. Czahor, the CIO at JFK Medical Center in Atlantis, Fla., opted to baptize his programmers by fire by having them report to line-department heads in the course of developing systems to meet line-department needs.

While programmers may have no choice in the matter, some users would rather fight than switch. As the vice president of IS at Coal Services Corp. in St. Louis, Richard J. Price has seen his share of user intransigence. His company's engineers have re-

Subscribe And Save. $~~94~~* $59

The basic one-year subscription rate for *CIO* magazine is $94.

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only $59, a savings of over 37% off the basic rate.

Name _____

Title _____

Company _____

Address _____

_____

City _____ State _____ Zip _____

**This is a domestic rate only (Canada & US). The foreign rate is $175 US.*

492

PROCESS IMMEDIATELY

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine
Attn: Circulation Department
P.O. Box 9208
Framingham, MA 01701-9900

ILLUSTRATION BY VALA KONDO

sisted a move from a process that relied on mainframe databases and manual drafting to powerful networked engineering workstations. Why? Because they would no longer have personal control over filing cabinets and drafting tables.

"We've invested very substantially in training engineers on the new systems," Price said. "We've coaxed them, cajoled them and, as necessary, coerced them into making the change." Price is still working on it.

Other organizations have had more luck with user attitudes, but as NCR's Jim Hull explained, buy-in is only part of the battle. "What you're doing is changing the responsibility of the people out in the field," said Hull, who is vice president of corporate information systems and services for the Dayton, Ohio, company. "Today [users] are responsible for managing their gateways. They are responsible for [making sure the system] operates the way it should, according to corporate standards."

Getting users to toe the administrative line for security and management purposes is no easy task, however. "Anybody can turn off a server. Anybody could leave a floppy disk out where somebody could destroy it or get it," Hull said. In order to ensure that users will think twice before doing so, NCR has put ultimate responsibility for data integrity and network administration in the hands of the financial officer at each unit.

Despite the difficulty of the task, Price believes that managing cultural change benefits the company as well as the worker. As he sees it, employees are valuable experts in the workings of the company and

DOWNSIZING

ONE CIO OPTED to baptize his programmers by fire. He had them report to line-department heads while they worked on systems to meet line department needs.

its business practices, climate, culture and politics. The key to successful change is not to browbeat, but to enlist employees through education and empowerment.

Ted Klein, president of the Boston Systems Group, a consulting firm that specializes in downsizing, suggests what he calls a "McDonalds approach" to enlisting user community support. He describes a franchise strategy in which the functional department takes responsibility for the operation of its own system, while using the methodologies and toolsets established by an IS group that is committed to addressing line-department business needs. While the franchise model allows CIOs to focus more on business problems, its success depends on IS leadership staying ahead of business-unit management in identifying opportunities for supporting the business through technology.

According to Klein, CIOs who fail to pursue this opportunity risk losing a great deal of influence in the corporation, especially in light of predictions that IS staff in downsized, distributed environments will increasingly report to business-unit heads. With smaller staffs to manage, CIOs must focus on becoming what CIOs have always wanted to be—visionaries. CIO

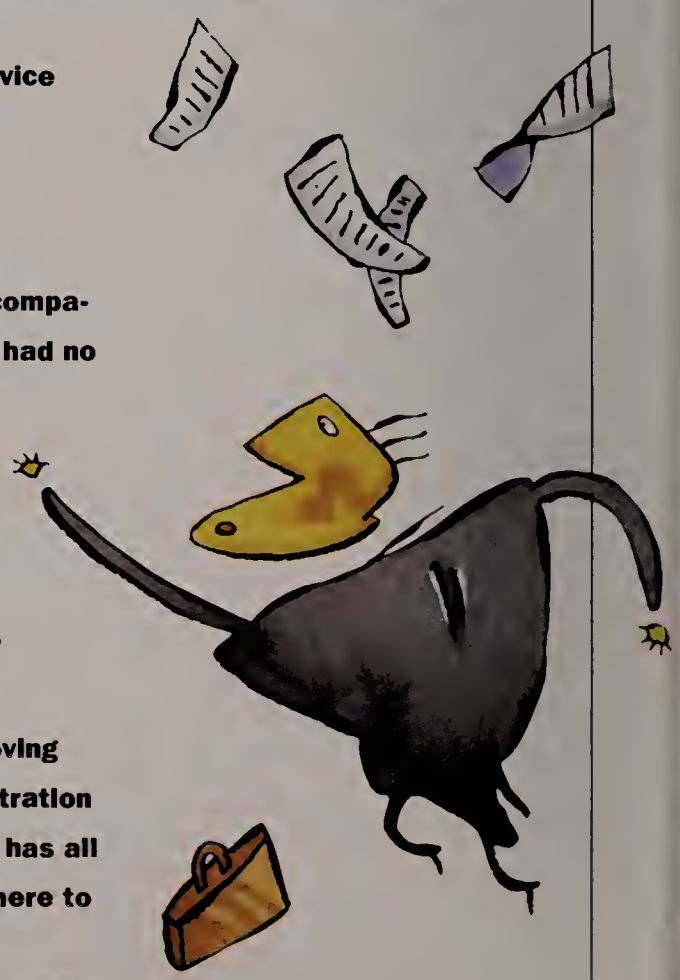
Down and Out...

CIOs need to find creative ways to deal with the problematic management and people aspects of downsizing. Some do a great deal of handholding to help IS staff and users through the transition. But perhaps the most ingenious approach is to find ways not to deal with those issues at all.

Federal Guaranty Insurance Corp. is a New York-based municipal bond insurer that in 1987 had reached the point where its reporting requirements exceeded the scope of its lumbering, overloaded mainframe. The company downsized to Novell networks, rewrote all of its applications, improved functionality and saved $4 million in IS costs. It simplified the handholding phase in IS by cutting 50 people from its staff of 70.

"We had [no choice but] to lay off a majority of the people," admitted First Vice President of FGIC Systems Services Andrei Chivvis.

"Out with the old, in with the new," quipped John Geyer, vice president and director of systems.



Down and In...

At Taylor Medical Inc., a medical and surgical supply company in Beaumont, Texas, CIO and Treasurer Jim Hayes had no problems with staffing but sidestepped a prickly network-management issue when he downsized to LANs from a wide area network of IBM System/36s.

Instead of spreading his four network servers around, he installed them in a single Plexiglas cabinet. "If you walked into this shop, you would think I had a mainframe," said Hayes.

The configuration may be contrary to the concept of moving functionality downward and outward, but it makes administration and troubleshooting a breeze. "This way, my hardware guy has all his problems in one place and doesn't have to run everywhere to maintain the system."

—M. O'Leary

Too much capacity.

Not enough capacity.

No capacity.

Now you can avoid the three biggest mistakes in data communications.

If you're like most people, sometimes you send huge volumes of data. And sometimes next to none.

That's why Sprint's Switched Digital Services make so much sense. They give you all the capacity you need. When you need it. Whether it's 56 Kbps for file transfer or 448 Kbps for videoconferencing. And you only pay for the time you actually use.

And we carry voice and data on the same network. Which has 100% digital switches. And 100% fiber optic transmission. Nationwide. So you get the reliability you need for critical data. And the accuracy. All for the price of a voice call.

If you'd like to know more, just call a local Sprint representative. And we'll show you how to handle big volumes of data. Without running into huge problems with your overhead.

Sprint.

Not just another phone company.™

DOWNSIZING

NUTS AND BOLTS

Some are soaring, more are stumbling, and most have had to compromise on the thorny technical issues that bedevil downsizing organizations

BY THOMAS KIELY

Is downsizing technologically feasible? The answer to that question depends upon whom you ask.

Rockwell International, of El Segundo, Calif., replaced old medium-sized mainframes with '386-based PCs at six of its 10 satellite printing sites across the nation. The big machines are gone; the raised floors are gone; the power and air requirements no longer apply—desktop machines now run the high-volume laser printers at one-fifth the cost. So it works.

At San Diego Gas & Electric, the power control department is trying to mesh two different workstation networks in its downsizing efforts. "The two principal platforms are IBM and DEC," said Ron Bushner, supervisor of energy management systems operations. "They say they're open, and they are—except to each other. Coexistence and interconnectedness are two different issues. We've got some work to do to get these to integrate." So, maybe it doesn't always work.

A Wall Street firm ran into difficulties downsizing an application to the Windows environment but had little difficulty downsizing to Unix and OS/2. Maybe it depends on the whims of the gods.

"The technology's a little raw and new," admitted Cheryl Currid, a downsizing consultant based in Houston. But she argues that the smaller processors and their networking-technology cousins can handle business systems that once lived on a mainframe—though it may take some tinkering and require certain tradeoffs.

Swapping small processors for big ones involves more than just tradeoffs, said Steven Bush, chief technical officer of DataAids, a systems-integration company based in Houston. The smaller file volumes of PCs and the fast storage and I/O capabilities of the mainframe mean that migrating applications to LANs "has proved more daunting than we had anticipated," admitted Bush. Other downsizing specialists add that network-management tools aren't yet available to adequately handle LAN problems, such as bottlenecks.

Then again, downsizing advocates argue that the distributed solution won't necessarily look like a mainframe solution—and that is why mainframe veterans can't grasp it. Take security, for example. "I reject mainframers' contention that it is easier to maintain security of data in the mainframe than in distributed [networks]," said Jim Hull, vice president of corporate information systems and services at NCR Corp., in Dayton, Ohio. The computer systems vendor has implemented distributed financial and manufacturing systems, and Hull contends that security on his systems is as secure as data in a centralized shop. "You have to build the security into the software," Hull explained.

That's not a solution available to all companies, cautioned Ralph Hubbard, president

of Technology Management International Inc., a Cambridge, Mass., consulting firm. "If you're a normal mortal, it's very difficult to have any real security in a client/server environment," Hubbard explained. "If you're Merrill Lynch or Travelers, you can put together what you need, but you've got to build it yourself."

Sophisticated distributed databases are another conundrum, noted Ted Klein, president of Boston Systems Group, a downsizing consultancy based in Boston. The software and database tools available now simply aren't up to the task of helping IS staff mesh sophisticated applications spread across many networks. The integrity of the data on distributed networks is yet another vexing problem, in many cases.

Then there are the little headaches. Federal Guaranty Insurance Corp., a New York-based municipal-bond insurer, reports that there are few useful tools to help network managers out of a jam. When the network crashes, the company doesn't trust its software to diagnose the problem with any degree of certainty.

Dyncorp, a diversified technical-services firm in Reston, Va., says that space management on the LAN is a thorny issue for them. And Richard J. Price, vice president of information services at Coal Services Corp. in St. Louis, recalls that his company worked with hardware vendors to "literally invent new multiprotocol bridging and routing technologies" to abet Coal's efforts to downsize to Unix workstations and PCs. These are clouds from Pandora's box: nettlesome problems resulting from the combination of frontier technology, experimentation and unfamiliarity.

Downsizing isn't for everyone, Klein pointedly remarked. Companies should pass on the trend if "they have a high degree of homogeneity in their technology, a high degree of synchronization across applications, and consistency across data." That may change in years ahead, as the technology changes, but for now some companies should stand pat.

In general, however, smaller companies will find it easier to downsize than will large centralized ones. Prospective downsizers will have greater success with controlled, bantam-weight projects than with big, politically risky ones. And don't downsize applications across WANs, many advise—that's a sure recipe for disaster. CIO

Life Lessons

Some words of wisdom from IS managers who have downsized and lived to tell the tale

RICHARD J. PRICE, *vice president of IS, Coal Services Corp., St. Louis*

- **Work with hardware and software manufacturers to develop customized solutions to your problems.**

JOHN T. CZAHOR, *CIO, JFK Medical Center, Atlantis, Fla.*

- **When downsizing an application, choose the software that does the job best; then choose the hardware. Many companies settle for limited software functionality when they buy for longstanding hardware platforms without considering compatible alternatives.**
- **Hire a software/hardware contract lawyer to negotiate performance criteria with vendors. Hold code in escrow in case the company goes out of business. Establish liability limitations for the vendors.**
- **For production systems, construct a cutover plan for each application that defines each task right down to the minute.**

BUTCH FERNSTROM, *director of MIS, Dyncorp., Reston, Va.*

- **Don't train too far up front. If you upgrade a system or have turnover among users between training and implementation, you've lost your training investment.**
- **Use real benchmarks rather than simulations. When possible, test applications with real data.**

JIM HULL, *vice president of corporate information systems and services, NCR Corp., Dayton, Ohio*

- **Develop an information architecture for the company, from client/server to simple terminal emulation. Know what your downsized environment is going to look like.**
- **Develop a concrete plan for managing data and managing your networks. What network-management software will you use? What kind of training will users require in order to ensure data security? Who will have ultimate responsibility for the integrity of data in the department?**
- **Set aside considerable time and money for retraining users and IS staff. Expect a period of lower productivity while users make their way up the learning curve.**
- **Have a migration strategy. Total downsizing should be done application by application, based on where you can get the highest payoff. Downsize the big, high-profile applications after the IS department has gained experience and downsizing has gained acceptance in the corporation.** **—M. O'Leary**

This is a giant step in

Always a Step Ahead.™

In a recent article, *PC Computing* named only one computer "the ultimate PC."

The Everex™ STEP™ Megacube.™ "Working with the Megacube is sheer joy...It gives me everything I'm looking for," said the reviewer.* Such unequivocal praise is no overstatement. Because with the STEP Megacube, Everex has achieved not one design breakthrough — but several.

A BIG STEP FORWARD LEAVES OTHERS BEHIND.

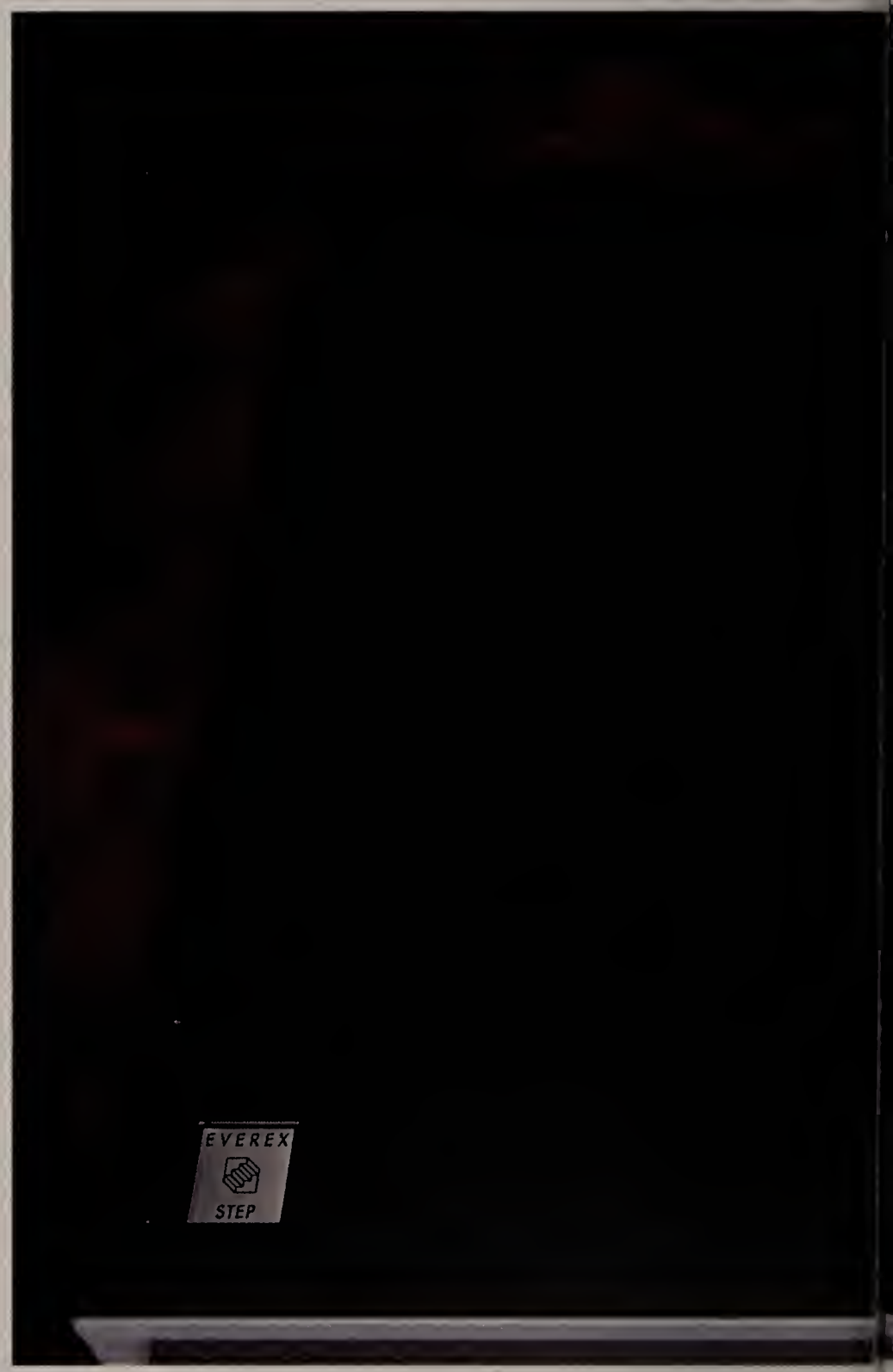
The powerful combination of Intel's hot 486™DX/50e CPU chip and Everex's proprietary Advanced Memory Management Architecture (AMMA™), a second level cache of up to 256K, makes for a warp speed of 31.3 MIPS.**

And with 12 expansion slots, 8 drive bays, a 400-Watt power supply, and up to 64 MB of memory–enough for even the most demanding applications–the STEP Megacube has more expansion capabilities than any computer on the market today.

THE ULTIMATE PC IS THE IDEAL FILE SERVER.

Everex has designed a powerful network server specifically to meet the requests of network and multiuser system administrators like yourself. Not only do you want a topnotch server that's expandable and performs well, but you also want reliability and serviceability.

In the STEP Megacube, you'll find everything you asked for and more. For example, recognizing that security is all-important on a network,

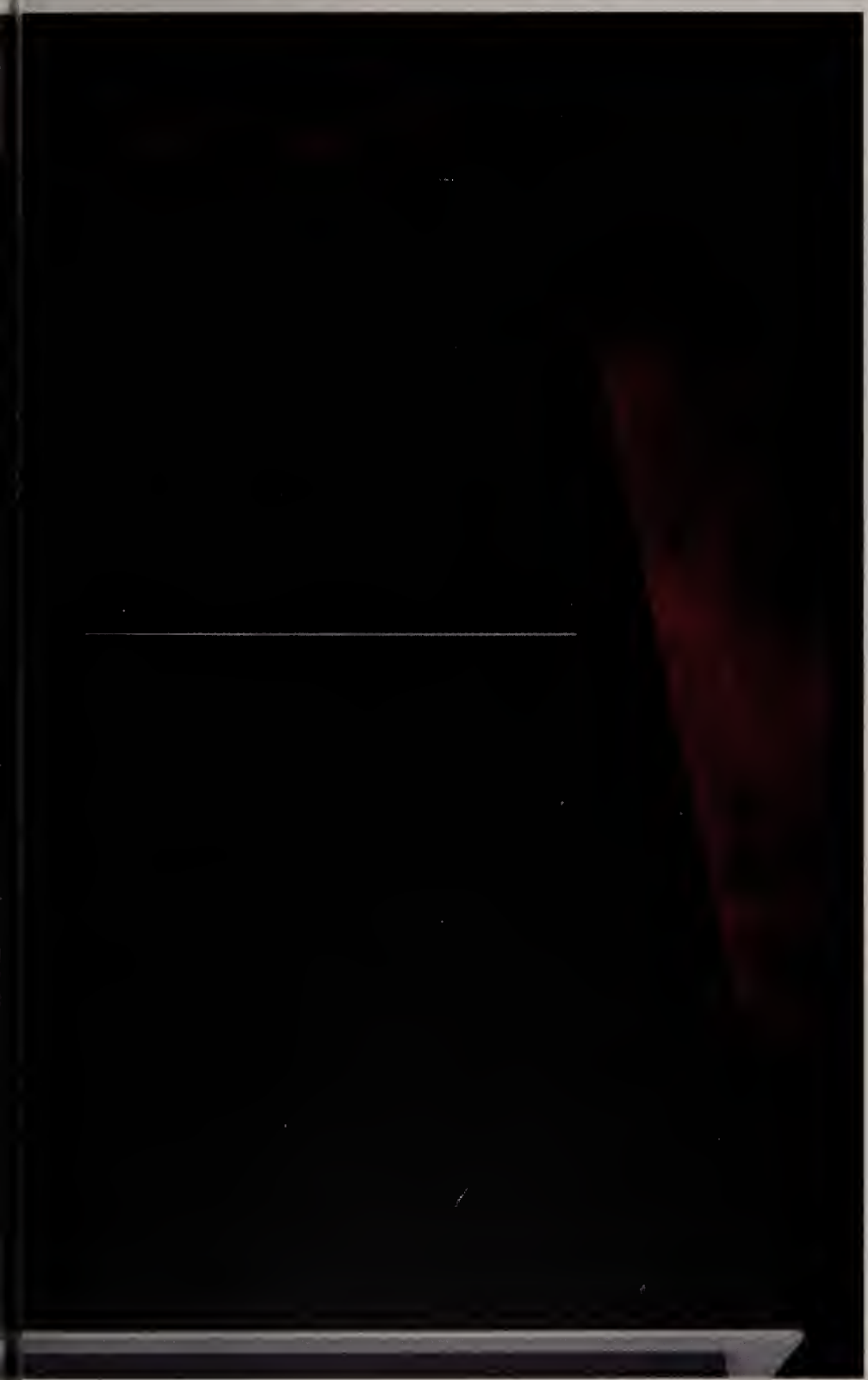


The STEP MegaCube is the first system to incorporate advanced thermal management to prevent problems caused by overheating. The Everex Thermal Management

STEP MEGACUBE 486DX/50e

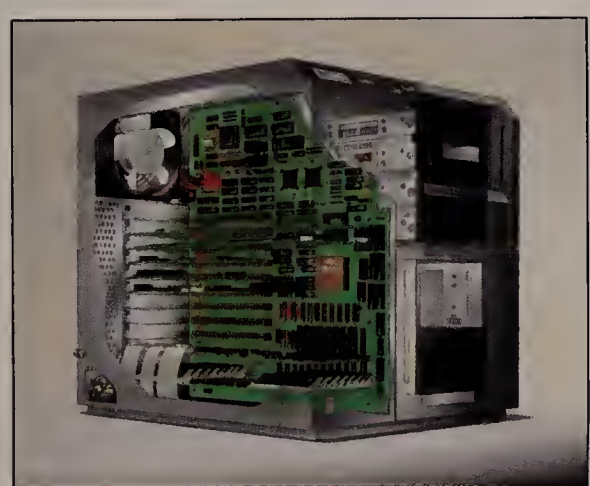
- 31.3 MIPS
- 486DX/50e Microprocessor
- 8 Half-height drive bays
- Up to 64MB of RAM
- 256K Cache
- 10 of the expansion slots are EISA
- 400 Watt power supply
- Everex Thermal Management System (ETMS)
- Side panels and drive bays mounted with thumbscrews
- Chassis locks
- Password protection
- Upgradeable to future-generation motherboards

personal computing.



System (ETMS™) maintains lower internal temperatures, and a dual compartmental design separates the microprocessor and disk drives, the hottest system components.

The entire interior of the cube is accessible in seconds through sidepanels, using thumbscrews. So it can be easily serviced without being moved, and without removing devices stacked on top of it. Everex has designed a special hydraulically-dampened door to keep dust and contaminants out of components that are accessible from the front of the system.



Everex has built in password protection to ensure that data remain safe from unauthorized users. And the STEP Megacube is even available pre-configured for Novell® Netware.

A COMPANY THAT'S ALWAYS A STEP AHEAD.

But file serving is not all the Megacube was designed for. On the contrary, this multifaceted computer performs equally well as a graphics workstation and multiuser system. You won't find a more versatile system anywhere, nor one with so many design firsts.

Megacube design innovations include everything from a distinctive cube design to a unique thermal management system that eliminates reliability problems caused by the heat from high-performance systems. And don't forget the remarkably low base price of under $7,899.***

But this should come as little surprise to anyone familiar with Everex and our wide range of quality computer products. At Everex, our mandate is "Always innovate, never compromise."

TAKE A GIANT STEP.

To find out more, call 1-800-258-3749.
It's certainly a STEP in the right direction.

EVEREX
EVER for EXcellence®

*Reprinted from *PC Computing*, June 1991. © 1991, Ziff Communications Company. **MIPS Source: Intelligent Devices' High Test Benchmarking Software. ***Suggested retail price. International Operations: Canada: 800-661-2003; France: 33.1.69.07.60.41; Germany: 49.69.69.50040; Hong Kong: 852.369.2828; Spain 341.430.9212; U.K.: 44.81.205.0607. GSA # GS00K90AGS5253. EVER for EXcellence is a registered trademark, and Everex, STEP, Megacube, ETMS, AMMA and Always a Step Ahead are trademarks of Everex Systems. i486 and the Intel Inside Logo are trademarks of Intel Corporation. Novell is a registered trademark of Novell, Inc. © 1992, Everex Systems, Inc.

And here are se
same d

STEP 386IS/16
- 3.3 MIPS*
- 2-16MB RAM
- Starting at $1,389**

STEP 386SX/20
- 4.6 MIPS
- 2-16MB RAM
- Starting at $1,539

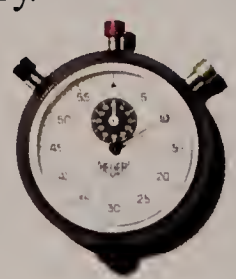
STEP 386DX/25
- 8.1 MIPS
- 4-64MB RAM
- Starting at $2,239

STEP 386DX/33
- 10.4 MIPS
- 4-64MB RAM
- Starting at $2,679

EVEREX STEP
Always a Step Ahead.™

The STEP Megacube isn't the only Everex STEP™ computer that outruns the competition. Any STEP you take gives you the best combination of price, performance and innovative engineering available in the PC industry.

Key to the STEP's blazing speed is Everex's proprietary Advanced Memory Management Architecture (AMMA), a second level cache of up to 256K.



SEVERAL STEPS THAT LEAVE OTHERS BEHIND.

The STEP line offers Everex's proprietary Advanced Memory Management Architecture (AMMA™), a second level cache of up to 256K. That increases cache hit rates to as high as 99%—maximizing overall performance.

And like the Megacube, the entire STEP line is expandable. Each computer has 8 or more expansion slots. And up to 64MB of RAM (up to 16MB in the STEP 386™SX).

What's more, with an IN STEP direct CPU replacement board, all 386DX STEP computers are easily upgradeable to *i*486 systems.

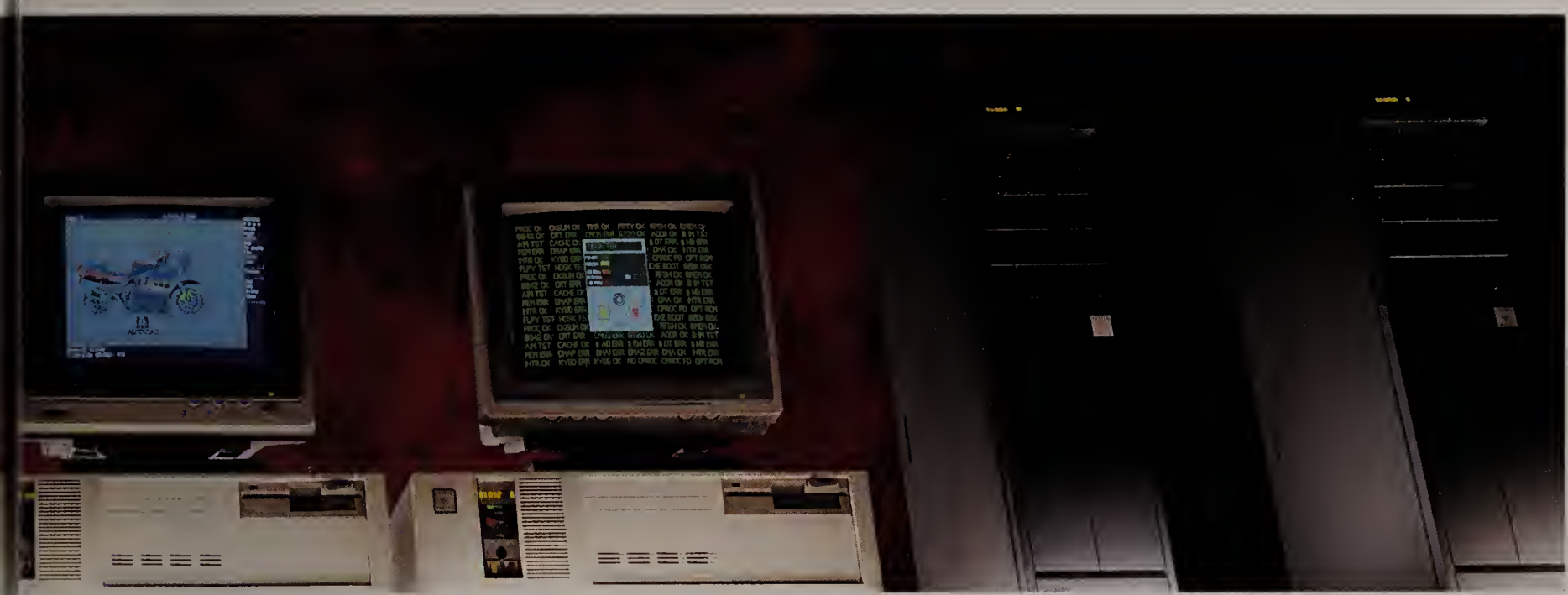
STEP's LED display provides detailed status

With every STEP computer, the following items are included free:

	Suggested Retail Value
FREE Windows™	$145
FREE Mouse	$80
FREE MS-DOS® 5.0	$130
FREE 1-year parts and labor warranty	NC
FREE 1-year on-site service†	$250
	$605

†*on-site service also covers all Everex peripherals in the computer system.*

veral steps in the irection.



STEP 486SX/20
- 13 MIPS
- 4-64MB RAM
- Starting at $2,839

STEP 486DX/33
- 21.7 MIPS
- 4-64MB RAM
- Starting at $3,789

STEP 486DX/33 EISA
- 20.8 MIPS
- 4-64MB RAM
- Starting at $4,589

STEP 486DX2/50 EISA
- 31.3 MIPS
- 4-64MB RAM
- Starting at $6,299

and error messages in English—not code. So problems can be identified and remedied faster, resulting in less downtime.

Everex has also added Programmable Configuration Select, so no diskettes or jumpers are needed for setup. And Programmable Drive Tables allow virtually any drive to be installed and used to its fullest capacity.

Should you ever need service, it's comforting to know that every STEP computer is backed by one-year warranties for on-site service and for parts and labor. (A three-year parts and labor warranty is also available.)

Detailed status and error messages appear on the STEP's LED display in English—not in computer code—so troubleshooting time is shortened.

intel inside

Knowing Everex, you'd expect nothing less. After all, we insist on quality and reliability in every computer product we sell.

TAKE YOUR NEXT STEP.

Call 1-800-258-3749 to find out more about the STEP line. You'll soon discover how far a STEP can take you.

EVEREX
EVER for EXcellence®

*MIPS Source: Intelligent Devices' High Test Benchmarking Software. **All prices are suggested retail. Actual prices may vary. International Operations: Canada: 800-661-2003; France: 33.1.69.07.60.41; Germany 49.69.69.50040; Hong Kong: 852.369.2828; Spain: 341.430.9212; U.K.: 44.81.205.0607. EVER for EXcellence is a registered trademark, and Everex, STEP, Megacube, AMMA and Always a Step Ahead are trademarks of Everex Systems. 386, i486 and the Intel Inside Logo are trademarks of Intel Corporation. MS-DOS and Windows are trademarks of Microsoft Corporation. ©1992, Everex Systems, Inc.

DOWNSIZING

PROFILE

MEANS TO AN END

For a Cleveland-based metallurgical firm, downsizing is the logical outgrowth of a quality-driven reengineering project

BY MEGHAN O'LEARY

When Jim Dudziak talks about downsizing, he doesn't just talk about downsizing. He talks about the things that give downsizing its significance: corporate culture, business direction, the economy, survival. "I have trouble calling downsizing a strategy," he said. "Strategy makes it sound more important than it is." For Dudziak, vice president of operations services at Brush Wellman Inc., a primary-metals processing company based in Cleveland, downsizing is a mere electrical impulse in the musculature of a companywide quality effort spearheaded by IS.

Downsizing is helping to set the stage at Brush Wellman for the inevitable client/server network architecture that Dudziak envisions under his company's total quality management (TQM) initiative. "Everybody wants an organization that is more flexible, innovative, entrepreneurial, creative, responsive to change," he said. "When you start talking about all those characteristics, you start talking about a networked organization."

IS's efforts to improve the way it delivers service and systems have been a major catalyst for downsizing and process improvement at Brush Wellman. Since 1988 the company has downsized and distributed major manufacturing and order-processing applications from the mainframe to IBM System/36s at its 14 plants. It is looking to do the same for human-resource and general-ledger applications as well, and is planning a move to more LAN-based systems over the long term. All of these changes are intended to simplify business processes and speed the flow of information so that the company can operate more efficiently and competitively.

Brush Wellman has always been highly profitable and very fast-growing. For decades, the $350 million company was the only non-Communist source of beryllium, an exotic and expensive material used extensively in automotive electronics, computers, telecommunications, and the aerospace and energy industries. The company had a virtual monopoly on the mining and processing of the element until the late 1980s, when people began to find cheaper substitutes. In addition, during the past year Eastern European companies have also begun to supply beryllium to world markets. Today Brush Wellman finds itself with shrinking profits in a very competitive industry.

In 1988 the company's now-retired CEO became concerned enough about the changing business environment and shaky customer loyalty to ask Dudziak to investigate the possibility of implementing computer-integrated manufacturing (CIM) at the company's plants as a way of improving processes and service.

"I knew real fast that [the answer] was not . . . to throw more computers into the plan," Dudziak said. Instead, he decided

JIM DUDZIAK DOWNSIZED TO GROW AND REVITALIZE THE COMPANY; NOT TO CUT COSTS.

PHOTO BY JACK VAN ANTWERP

SNAPSHOT

A changing business environment and shaky customer loyalty prompted Brush Wellman Inc. to embark on a TQM program spearheaded by IS. The decision to downsize as part of that effort was less about saving money than about growing and revitalizing the company.

that the company needed to improve and simplify its business processes across the enterprise. Dudziak's analysis launched a companywide business-process reengineering effort based on the principles of TQM. Dudziak not only made the recommendation for TQM; he volunteered the IS department to spearhead the effort by improving its own customer service and efficiency.

Dudziak had IS interview its customers about their needs and their opinions of IS performance. The results showed that internal clients were frustrated with backlogged applications and what they perceived as a lack of responsiveness from the IS department.

Once it began to pursue TQM in earnest, the IS department recreated itself, reorganizing into five teams that address such critical areas as project development, estimating, systems-development methodology, maintenance and quality assurance.

The systems-development methodology group adopted a new, more-formal methodology that stresses prototyping and joint application design with users. Systems analysts learned to work more closely with users to identify their needs. Downsizing was a natural extension of that, Dudziak explained.

"When you analyze the processes that have to take place, . . . after a while it becomes relatively clear what platform the application should be on." These days, the IS group gets regular input from key users

DOWNSIZING

"THERE WAS A great fear of the unknown."
-Jim Dudziak

and managers on which applications they should be reviewing and revamping.

Since downsizing is only one wave in the tide of change brought on by Brush Wellman's TQM effort, Dudziak has found that his users are getting accustomed to doing things in new ways and are less resistant to moving to new systems, tools and procedures. Nevertheless, he has not escaped the difficulty of IS resistance. "We've had our share of resistance from very good people," he said. "You take very good CICS Cobol programmers and you tell them that they're going to start working on a 4GL or a PC and that just blows their minds. Those people have a lot of trouble opening their minds and making the transition. In my view it's a great career opportunity, but to them it's a great threat."

Dudziak was prepared for such resistance. Early on in the TQM effort he brought in an organizational psychologist whose charge was to ease the transition to a team-based workforce. The psychologist helped management identify the major cultural differences between the old operational model and the new, and prepared them to deal with employees' anxiety about the change. Still, Dudziak struggled to get his staff to embrace the team model and new development skills.

"There was a great fear of the unknown. It's a very slow process of trying to open their eyes to the fact that our world in IS is changing dramatically." Ironically, the recession has aided Dudziak in the move toward downsizing. "It has shown us that we're vulnerable," he explained. His staff realizes that the company must change to prosper in hard times.

Dudziak is not one to get caught up in downsizing boosterism, however. His downsized network includes a mainframe—albeit as a node. He considers it "totally unrealistic" to get rid of the mainframe when certain financial and operating information will always need to be centralized.

Another area in which he bucks trends is that of user maintenance of network nodes. "My personal opinion is that to expect the users to actually accept and enforce the discipline of [the IS] profession is naive," he said. "They don't really want to do that stuff. They just need the tools and the information."

For now, Dudziak has network administrators at the largest plants, but they are people for whom it is one of many jobs. And he has no plans to farm staff out to all network locations. He relies on network-management tools, from Digital Equipment Corp. and Computer Associates, to allow him to do some remote administration, and he is willing to wait for the slew of network-management software that every vendor and consultant is promising.

The way Dudziak sees it, if his company does its TQM job right it will enjoy greater productivity, less waste and lower costs. Still, he stresses that his downsizing efforts are not cost-driven, but an effort to be able to grow and revitalize the company. "I've read all about the economics of downsizing, and there are so many hidden costs in this thing that I'm not comfortable harping on what a great cost thing it is," he said. "I'm more into focusing on what it does for your business."

He is wise to do so. He admitted that 1991 was the company's worst year since the 1960s. "This was an improvement project when we started," he said. "Now, it's a survival project." CIO

TECHNICAL PROFILE

Brush Wellman Inc. is a $350 million metal-mining and -processing concern based in Cleveland, with 14 plant locations in the United States and three in Europe. It develops products used in the automotive-electronics, computer, telecommunications, aerospace and energy industries.

Large and Mid-Range Systems: Since 1988, Brush Wellman has moved manufacturing and some order-processing applications from its IBM 9121 mainframe to System/36s on the factory floors; these are also running planning, scheduling, shop-floor-reporting and process-control applications. It recently upgraded its mainframe to the Model 260 and is enhancing the mainframe via IBM's Enterprise System Architecture. The company has several VAX minicomputers from Digital Equipment Corp. at its data center in Cleveland and plans to purchase more for its factories as it continues to downsize applications. It is beginning to develop applications in IDMS for the VAX.

Microcomputers: Brush Wellman uses PCs primarily for nonproduction applications and has about 500 companywide. About half of that number are in LANs. Most of the stand-alone PCs are running mainframe or System/36 emulation.

Communications: The company has a leased-line, multidrop system connecting its U.S. locations. The system is used primarily for real-time order processing.

When it comes to overseas private lines, are you in over your head?

Undersea cable. Outer space satellites. Foreign regulation. Domestic regulation. Today's needs. Tomorrow's needs. At AT&T, we know that global communication management has more variables than ever before. So it's sometimes easy to feel a bit overwhelmed by the challenge.

But when you're with AT&T, you've got a partner with over 60 years of international experience. Relationships with phone companies around the world. And AT&T representatives in 32 countries.

What that means to you is coordinated support for both ends of your private network. With services like single end ordering and billing, 24 hour single source troubleshooting and network monitoring. Plus AT&T will handle implementation issues like circuit provisioning at the foreign end.

We call this program AT&T Account Management Plus. It's an incredibly efficient way to manage your international private line. And we provide it to you at no extra cost.

So before you make your next international call, call AT&T at **1 800 448-8600, ext. 444.**

And discover the advantages of a company with real depth in overseas services.

AT&T
The right choice.

The Shadow Analysts

Independent systems specialists laboring within your company's business units need to be brought into the mainstream

BY DAVID J. MARLEY AND DON W. MYERS

They are talented, loyal and enthusiastic; self-starters with a penchant for solving problems on their own and a demonstrated ardor for technology. And they may be obstructing your organization's road to productivity and efficiency.

At GPU Nuclear, headquartered in Parsippany, N.J., they have been dubbed "shadow IS analysts"—systems specialists who labor in the relative isolation of their business units, remote from the activities and goals of corporate IS. Occasionally they are consultants or freelancers who came on board for a specific project and then stayed. But more often they are simply function employees hired to fill nontechnical positions, whose interest in computers led them into systems design and support. Making up in enthusiasm what they lack in training, these shadow analysts fill the gaps created by what the business units perceive to be an insufficiently responsive central IS organization.

It is not surprising that these analysts enjoy strong credibility within the business units. After all, they possess a thorough knowledge of and loyalty to their individual functions, and fulfilling the needs of those functions is their first priority. Unfortunately, the benefits of specialization are often offset by the drawbacks of isolation. With few opportunities for training, exposure to new technologies or interaction with their technology peers, the shadow analysts tend to lag increasingly behind their corporate counterparts.

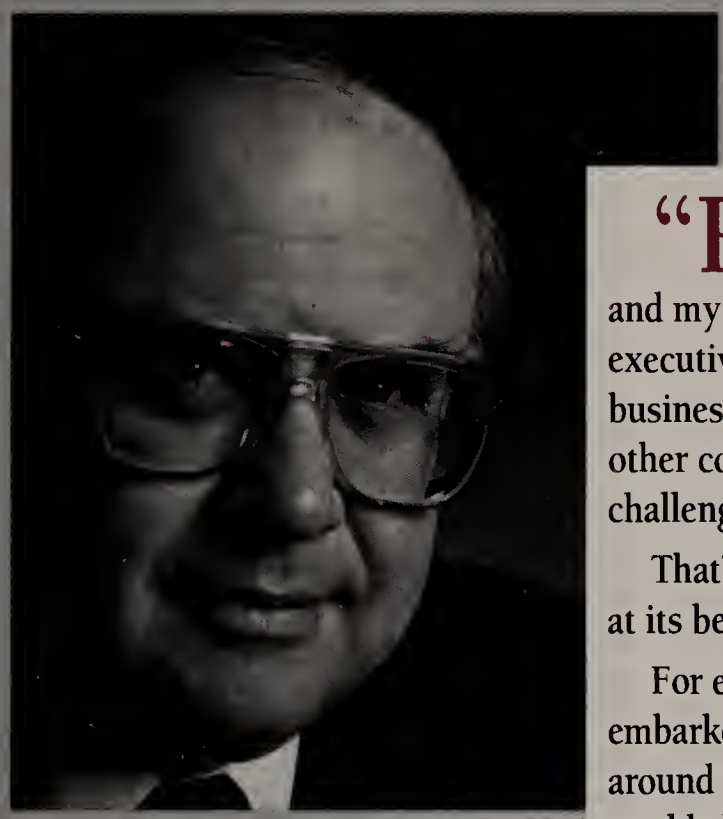
Such employees are generally very parochial in their approach to technology, relying on one language or tool, which may result in excessive development time or operations costs. Shadow analysts rarely develop applications in accordance with corporate standards, and they often fail to provide maintenance documentation, which makes life difficult for functional managers when the analyst leaves the company or moves to another unit. Finally, shadow analysts tend to operate with a short-term perspective, undertaking projects that provide immediate gratification to users while locking them into a less-than-optimum solution for the long term.

The attitude of corporate IS toward these shadow analysts has traditionally been one of frustrated tolerance. On the one hand, CIOs recognize the close relationship between functional systems specialists and their users, and they appreciate the degree to which shadow analysts take some of the workload off of IS. On the other hand, with the increasing emphasis on interconnectivity and standardization, they are annoyed by shadow analysts who go their own way, with little or no attention to corporatewide integration.

The challenge: to bring shadow

ILLUSTRATION BY LINDA BLECK

"I can't place enough emphasis on the value of peer interaction – it consistently makes a difference in the way I solve business problems."



Sid Diamond
Vice President of Worldwide
Information Services
Black & Decker Corporation

"Peer networking has been vital to me and my company. By interacting with other IS executives, I get a personal sense of strategic business issues and learn first hand how other companies approach the same kind of challenges I face.

That's why I joined SIM—for networking at its best.

For example, when Black & Decker embarked on a Total Quality Initiative, I called around the SIM network to find a colleague at a world-class company who was further along on the learning curve. I found an invaluable source who willingly hosted my team for a day and shared his company's experiences. Thanks to his candor we saved significant time and money that probably would have been spent working with consultants. Later on, we were able to return the favor by helping his company when they needed to improve their order processing system. With SIM, it's easy to develop peer-to-peer rapport among professional colleagues.

SIM offers an array of networking opportunities – like conferences, chapter meetings, and one-on-one contact – and I like to take advantage of them all. In my experience, SIM provides the best networking in the IS industry – both for me and for Black & Decker."

Business Benefits from the Best

The Society for Information Management

- Bringing together information systems executives from leading companies around the world
- Advancing the use and impact of information technologies to achieve business objectives
- Fostering meaningful peer relationships
- Engaging members on a local level through 30 active chapters
- Recognizing excellence with the *Partners in Leadership Award*, the most highly acclaimed award in the industry
- Educating members through local, national and international conferences, roundtables, publications and special reports
- Supporting research to further the information systems profession
- Advancing the IS industry perspective to business, government and society

SIM
International

Interaction, Information, Innovation

For membership information, please contact:

SIM Headquarters
401 N. Michigan Avenue,
Chicago, Illinois 60610-4267
312.644.6610

analysts in from the cold without destroying their independence, initiative and intimacy with the business units.

Two recent developments have made this goal more attainable. The first is a fundamental change in the nature of corporate IS itself. With the advent of powerful PCs, LANs and user-friendly software, clients can now do much of their own design and analysis. IS must accept the fact that it is no longer the sole technology provider and evolve instead into a kind of consultant or enabler whose function is to establish a framework within which all employees can use information. This shift should leave shadow analysts with greater opportunities to take the lead on their applications without stepping on corporate toes.

The second development is economic: the need to reduce staffing levels while ensuring maximum productivity. Pocketbook management has increased recognition of both the shadow-analyst situation and the need to act on it. Attempts by some companies to solve the problem by swallowing it whole—moving shadow analysts into corporate IS and assuming sole responsibility for the care and feeding of the business units—only creates antagonism in end users who are loath to sacrifice priority treatment.

GPU Nuclear has approached the problem from another angle, and the results have exceeded expectations. GPU's central IS organization is located in Reading, Pa.; the corporate headquarters in Parsippany and three operating companies elsewhere all have their own IS groups. Last year, GPU launched a pilot program designed to forge a partnership between central IS and its dispersed clientele.

GPU initiated its program with five analysts. Twice that number are currently involved, and IS has targeted another 30 or so whose participation it hopes to enlist in the near future. Under the program, all participants remain in their current locations and continue to report to their functions' management. But they are also given a strong dotted-line relationship to a site support group at corporate headquarters, which reports in turn to central IS in Reading. Skill profiles are drawn up for all participants, as are individual training programs designed to familiarize each with the company's architecture and with any hardware and software appropriate to their duties.

The program treats all participants like central IS employees. The shadow analysts attend staff meetings, off-site meetings and technology briefings; they have input into what standards IS selects and what directions it takes. Furthermore, shadow analysts can now seek support directly from IS staff and management, and they rotate through GPU's Client Support Center in order to broaden their technical skills and gain expo-

"Off-site data storage is one thing.

Performing in the face of disaster is an entirely different matter."

Thomas H. Seefurth
President and
Chief Executive Officer
Arcus Data Security, Inc.

Clorox can attest to that.

"I want to thank you very much for your outstanding help during the recent earthquake emergency. Since our business is so highly dependent on computer systems, we count on your service. In this emergency, you performed very well, and we want to thank you and your company for your support."

Raymond H. Johnson
Vice President

sure to other parts of the company.

Despite the apparent benefits of such a plan, both sides were initially skeptical that it would work. Some business units feared the program was a power play to wrest control of their resources; others understood the goals but were concerned that by reporting to the site support group, they would sacrifice control of their priorities. The debate within IS centered on whether former outsiders could conform to a more traditional role, and what the sudden tapping of a well of considerable talent would mean in terms of competition for advancement and other benefits.

The dual reporting relationship was established to calm fears on the business side, allowing corporate IS to assume the less-threatening visage of technical adviser rather than priority setter. Early doubters in the IS organization now recognize significant contributions from people they previously considered loose cannons—and the extra competition has made everyone work harder.

The challenge: to bring shadow analysts in from the cold without destroying their independence, initiative and intimacy with the business units.

The effect of this program on morale has been enormous. Shadow analysts who previously lacked the positive reinforcement of peer review and support. Suddenly they are now part of a team, making a visible difference and receiving companywide recognition for their labors. Broader experience and greater opportunities for vertical movement have made their career paths brighter: Even their titles have been changed to reflect more traditional IS positions.

Training and education, meanwhile, are producing improved support for the business units. And since functions retain control over their significantly enhanced resources, they need no longer worry about being left high and dry should their IS person leave the company.

But the greatest gainer may be the company as a whole. As a result of its shadow-analyst program, GPU Nuclear has experienced improvement in productivity, training, internal support and the sharing of resources. The program has support from the top levels of management and is highly visible: Functional managers have actually begun approaching central IS with candidates they would like to enroll. CIO

David J. Marley is client services director and Don W. Myers is vice president and comptroller at GPU Nuclear in Parsippany, N.J.

Donaldson, Lufkin & Jenrette can attest to that.

"Thank you for assisting us in what was a highly potential disaster. Our strategy during the black out of lower Manhattan was to be prepared to move, at a moment's notice, to our hot-site. Your company did exactly what we required. Thank you again for your exemplary display of solid disaster recovery support when we needed it."

Anthony J. Alfono
Assistant Vice President

Levi Strauss & Co. can attest to that.

"LS & Co. has always valued our relationship with your company, but your extraordinary efforts during the earthquake in San Francisco demonstrated that you are a true business partner."

Robert D. Haas
Chairman & CEO

No Data. No Recovery.

Call Arcus Data Security
1-800-GO ARCUS

ARCUS

Listening In

Technologies that can recognize and act upon human speech are rapidly coming of age

BY ELAINE CASCIO

Considering the rapid advances in voice technologies in the past decade (in 1982, you could count the number of operational voice-messaging systems on one hand), it's not surprising that technologies exist today that can recognize and act on human speech. Although today's speech-recognition systems have the ability to recognize only a limited vocabulary of words, manufacturers and analysts see big growth in this burgeoning market. Estimated sales of telephone-based speech-recognition systems were $20 million in 1990 and are expected to reach $150 million in 1995, according to Vanguard Communications Corp. of Morris Plains, N.J. Desktop and microphone-based applications that do not use the telephone network also exist.

Most people are familiar with voice-response systems, which prompt users with recorded words and phrases to place orders or process transactions by using their telephone keypads to input digits and spell out words. Speech recognition provides the same type of functionality, but users speak the letters, numbers, words or phrases instead of punching them into the keypad.

PHOTO BY RALPH MERCER

Two Types of Recognition

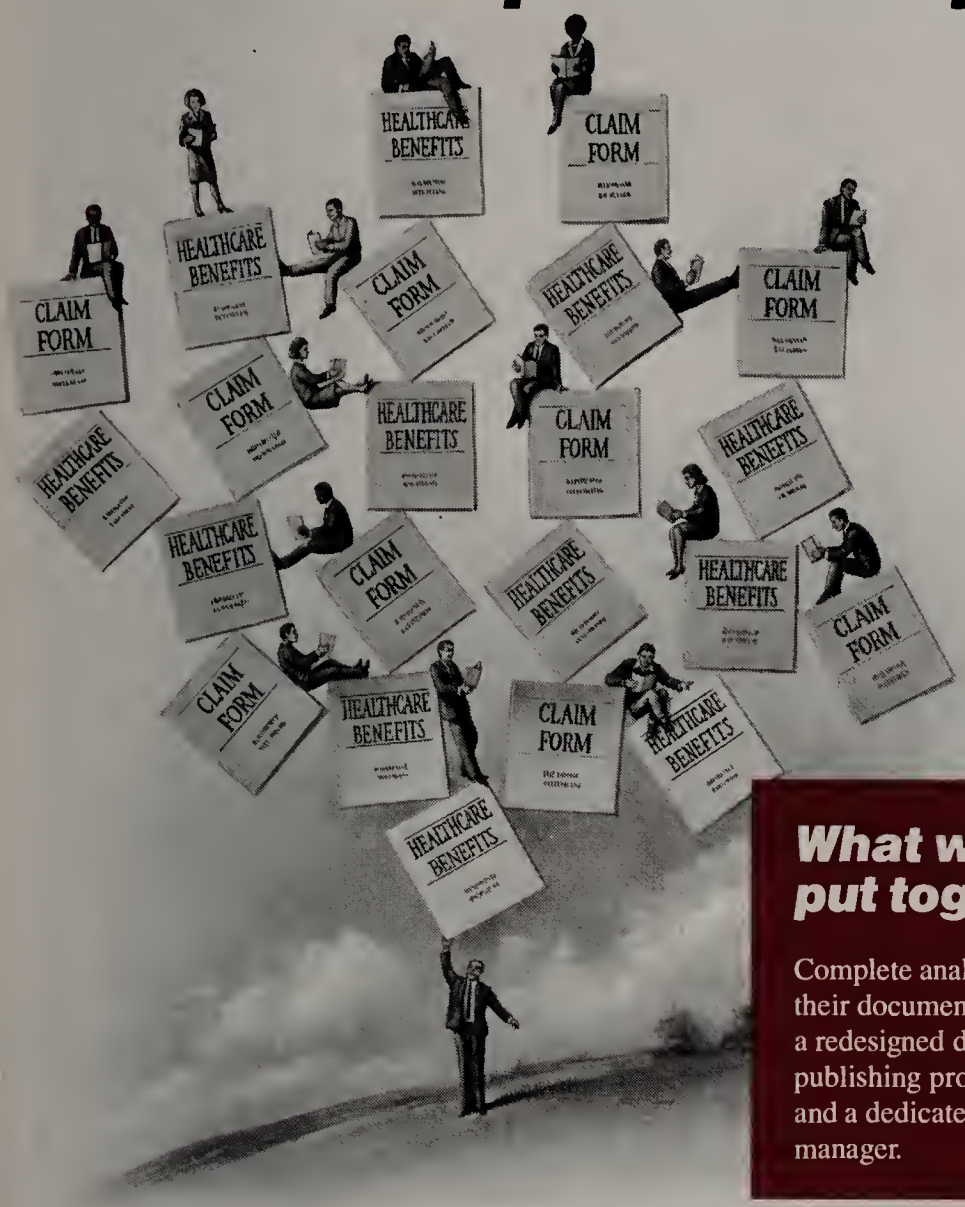
Speaker-dependent technology provides better security than speaker-independent systems, and it allows for larger vocabularies and continuous speech. However, it requires a user to literally "teach" the system by speaking words or phrases, which are stored by the system and—through voice-pattern matching—are accessed and acted upon each time the user speaks a command. The system recognizes only that user and the words in which it was trained.

Speaker-dependent systems tend to be employed in vertical markets with specific needs and are often desktop rather than telephone-network based. Several manufacturers are pioneering their use in areas such as securities and commodity trading and for medical reporting. In the securities-trading environment, these systems help reduce the paperwork involved in the dozens of transactions a trader makes daily. Trades are generally made verbally, then the transaction is documented and recorded. Desktop speaker-dependent recognition can record the verbal transaction directly into an online system, eliminating the ensuing paperwork. Best of all, the technology works with the trader's most-used tool—his voice.

For large, commercial applications performed primarily over the telephone, speaker-independent recognition is more appropriate. It recognizes American English speech regardless of the speaker and re-

XEROX

They calculated that a 100% increase in business needed a 900% increase in productivity.



What we put together.

Complete analysis of their document needs, a redesigned document publishing process, and a dedicated account manager.

Lynn L. Wells
Document Management Representative

When a major health insurer suddenly doubled its customer base, their MIS department quickly predicted disaster. The company's in-house document publishing system was already overloaded. They had to drastically cut the time it took to produce vital documents or risk the company's reputation for customer service. That's when they called Lynn Wells and the Xerox team.

Working together, they saw that merely upgrading equipment to add capacity was not the solution. So they took a fresh approach and completely redsigned the company's document publishing processes. Carefully building on existing systems, they integrated Xerox workstations, software, scanners and laser printers to create a custom publishing network.

Benefit booklets that once took forty-five days to publish now take less than five, a 900% increase in productivity. MICR-encoded checks and claims explanations are being printed and mailed together, saving $350,000 a year in postage. And forms are now created electronically, on demand, reducing costs by 30%.

If saving time, money and customers is your idea of a productive partnership, let us help you put it together. Call 1-800-TEAM-XRX, ext. 147G.

Xerox
The Document Company

USA XEROX

© 1992 XEROX CORPORATION. XEROX® The Document Company and Document Machines are trademarks of XEROX CORPORATION. 36USC 380

quires no training. However, it does require the creation of huge voice databases containing samples from hundreds to thousands of speakers (male and female, from all over the country, under varying telephone-line conditions) in order to build a vocabulary. As a result, most current system vocabularies are limited to well under 20 words (such as the digits 0 through 9 and variations of yes and no responses).

When a caller speaks, the system recognizes what he or she is saying based on statistical-modeling techniques performed on the installed vocabulary. To give an idea of the scope of speech-recognition databases, Texas Instruments has developed a "Voice Across America" program involving over 200,000 participants throughout the United States to create a demographically balanced database for its speaker-independent systems. Sampling data is collected not only on dialect variations and speaking styles, but also for telephone device and channel characteristics.

What's New

Recent developments in speech recognition include speaker adaptation, keyword spotting and phoneme recognition. Speaker-adaptive systems allow for natural fluctuations in a speaker's voice. Systems that use keyword spotting ignore utterances other than the critical words or phrases that the system is trained to recognize ("Er, yes, my *account number* is ... ah ... *192435*. Thank you.").

Phoneme-based systems recognize not whole words, but rather the subword components (phonemes and demi-syllables) that make up words. They use statistical analysis and language-modeling techniques to assemble the components and build complete words. It's interesting to note that there are relatively few such subword components for all the words in the dictionary. Phoneme-based systems do not have to be trained to recognize each separate word, but they do require a dictionary that breaks each desired word into its subword components. This becomes complex because the components can change depending on where a word is within a sentence, or what words are next to it.

Although these techniques enable speech-recognition systems to recognize more words without dramatically increasing vocabulary size, the context of a word can be misunderstood. Systems need the capability to understand grammar and language structure as well.

Speaker verification is used to reduce fraud in telephone calling-card transactions and to provide access to secured data or allow a verified speaker to perform transactions over the telephone.

That's where what many predict to be the next generation of recognizers will come in. Research currently underway on artificial-intelligence techniques such as neural networks and auditory modeling is intended to create systems that can distinguish contextual nuances and actually learn new words and speech patterns. Much of this research is based on human auditory and processing patterns. In a very limited, controlled sample, AT&T Bell Laboratories, in Murray Hill, N.J., tested a speaker-independent neural network with a 99.1 percent degree of accuracy in word recognition.

Another development is the ability to recognize continuous versus discrete speech. Discrete systems require the speaker to stop momentarily after each utterance rather than run words together. They can be effective for understanding commands or capturing short sequences of numbers, especially if the speaker is familiar with the system and how it operates. Continuous-recognition systems are more effective with casual, untrained users, such as bank clients using a retail-banking application.

The Applications

Among the primary applications for speech recognition are telecommunications, order entry, customer inquiry, and reporting. Many telephone companies are using voice recognition for alternate-billed calls (collect, person-to-person or calling-card calls), as well as for voice dialing. As early as 1989, Ameritech, a Regional Bell Operating Co. based in Chicago, was using an application that employed both voice response and speech recognition for alternate-billed calls; and Bell Atlantic, an RBOC in Philadelphia, recently announced a speech-recognition trial for voice dialing and call completion.

Users of speaker-independent speech-recognition technology include Amway Corp., a consumer products company based in Ada, Mich., whose dealers and distributors use it to place orders, and the United States Bureau of Labor Statistics, which tested the technology as an alternate method of receiving monthly data from reporters nationwide. In Belgium, it is even being used for caller responses to a radio and television quiz show.

The telephone-based market may be the richest for speech recognition, but it must overcome differences in the wide variety of telephone devices, public-network line noises and background noises in order to isolate speech. Noise immunity is one of the areas manufacturers are working on improving today.

Speaker Verification

Another leading-edge speech technology, which is often confused with speech recognition, is speaker verification. Used primarily in security or fraud-prevention applications, speaker verification does not so much recognize words as it is trained to recognize the characteristics of an individual speaker's voice. General-

Lew Temares
Vice President & CIO
The University of Miami
Information Resources Department

"Product quality. Technical excellence. Industrial-strength applications. Three simple reasons why Computer Associates has been my most important software vendor for more than 10 years."

CA90s
CA's Computing Architecture For The 90s

Service and support. Financial stability. They all matter a lot. But ultimately, what matters the most is the quality of the software itself.

Which is why 95% of the Fortune 500 choose CA software. We invest more in R&D every week – $4 million – than the average software company earns in a year. And it shows. In a world filled with software crashes, CA software is a shining example of reliability. They call it mission-critical software. And we agree.

To us, every mission is.

COMPUTER® ASSOCIATES
Software superior by design.

© Computer Associates International, Inc., One Computer Associates Plaza, Islandia, NY 11788-7000. 1-800-CALL CAI. All product names referenced herein are trademarks of their respective companies.

ly, at the time an individual enrolls, he or she is asked to repeat a password or code several times; the system uses this information to create a "template" or "voice print" of the speaker's voice. Each time the system is accessed thereafter, the speaker's voice is matched against the template and its authenticity accepted or rejected.

Speaker verification is used to reduce fraud in telephone calling-card transactions and to provide access to secured data or allow a verified speaker to perform transactions over the telephone. It is even being used in law enforcement to ensure that parolees and those under house arrest are where they should be. There are also a large number of microphone-based applications, as companies use speaker verification to replace card keys or security codes for physical access to secured facilities.

Manufacturers of speaker-verification systems are looking to lower the number of false acceptances and rejections to a level that makes such systems feasible for companies that must maintain a certain level of security. (False acceptances and rejections are often a result of normal telephone use; network noise, environmental conditions and the variations in telephone microphones can raise the false acceptance rates to as high as 5 to 10 percent over the public network.) Vendors are also trying to reduce the time it takes users to enroll in a speaker-verification system; currently, most users must repeat a password five or more times to create a template.

As with speech recognition, speaker-verification systems must somehow accommodate changes in a user's voice that result from stress or illness. Several speaker-verification manufacturers claim to have built-in features that maintain security while allowing for such changes. Many are also examining systems that allow for "free text" as opposed to "fixed phrase" recognition.

Free-text recognition systems will provide speaker verification based on the speaker's voice characteristics regardless of whether the system is trained to recognize specific words or phrases.

Market Acceptance

What about the human issues involved in implementing these speech technologies? Ironically, they may actually overcome some of the roadblocks encountered by traditional voice-response and voice-messaging technologies by allowing callers to speak responses as opposed to entering letters and digits over a tone telephone. Spoken responses may be more comfortable for certain segments of the population, and they are a boon for many with disabilities. Speech technologies also enable rotary callers to access and act on information. Although lack of tone telephones is barely an issue in business-to-business applications, recent statistics issued by Advanced Telecom Services Corp. of Wayne, Pa., indicate that 38.5 percent of homes that are served by the RBOCs still have rotary telephones.

Most speech recognition falls into the category of enabling technologies, making it possible for users to place a call, make a transaction, respond to a survey or obtain information. When used in conjunction with voice response, speech recognition allows a caller to process a transaction by either voice or keyed-in digits. It can also be integrated into voice-messaging systems, allowing a voice-mail subscriber to speak his or her password and commands rather than enter tone digits; this makes users messages accessible even in remote locations where tone service is not available.

To be widely accepted, speech-recognition systems must recognize over 100 words of continuous speech—a capability that industry observers predict is less than five years away.

Speech-recognition technologies are coming of age. With the current improvements in system performance and increases in vocabulary size, who knows—a decade from now perhaps speech recognition will be as ubiquitous as voice-messaging is today. CIO

Elaine Cascio is a senior marketing associate at Vanguard Communications Corp., a consulting firm in Morris Plains, N.J.

Leading Telephone-Based Voice-Recognition Vendors

COMPANY	OFFERINGS
AT&T Bridgewater, N.J. 908 658-2604	Speaker-independent recognition Continuous recognition
Digital Equipment Corp. Merrimack, N.H. 800 832-6277	Speaker-dependent & - independent recognition Continuous recognition Verification option
Lernout & Hauspie Speech Products USA Inc. Woburn, Mass. 617 932-4118	Speaker-independent recognition Continuous recognition
Scott Instruments Corp. Denton, Texas 817 387-9514	Speaker-independent recognition
Texas Instruments Austin, Texas 800 527-3500	Speaker-independent recognition Continuous recognition Speaker verification
Voice Control Systems Dallas 214 386-0300	Speaker-independent recognition Continuous recognition Speaker verification
Voice Processing Corp. Cambridge, Mass. 617 494-0100	Speaker-independent recognition Continuous recognition
Votan Pleasanton, Calif. 510 426-5600	Speaker-independent recognition Continuous recognition Speaker verification

Source: Vanguard Communications Corp.

Portia Isaacson's Pen-Computing Workshops

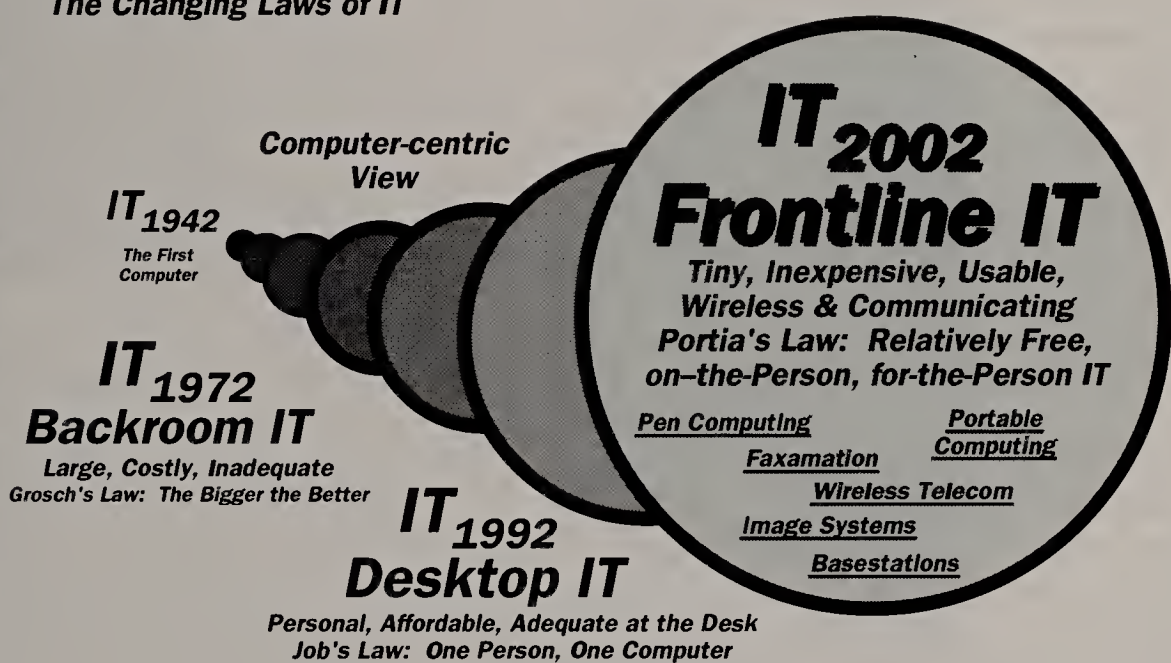
Pen-Computing Opportunities

The Future of Information Technology (IT)

Portia's Unified Business Theory

Pen-Computing Application Experiences

Re-paradigming IT
The Changing Laws of IT



Sponsored by

CIO Magazine

DREAM IT
A PORTIA ISAACSON COMPANY

At your company? Or . . .
April 15-16 in London
May 20-21 in Silicon Valley
June 9-10 in Dallas
June 16-17 in Boston
September 17-18 in New York
Please call for additional dates
(Dates subject to change)

Dream IT, Inc.
PO Box 1028
Cambridge, MA 02140
Fax: 617/ 354-7509
Voice: 617/ 354-2160

Two creative days you won't soon forget! Small groups. Over 200-chart notebook plus demos and pen computing hardware, software, and technology literature.
Please call for agenda & other information.

FYI

The Minding of Your Meetings

If your office is anything like our office, setting up meetings can be nearly as bad as having to hold them in the first place. Coordinating the schedules of 10 or 15 invitees generally means time-consuming rounds of telephone tag or E-mail negotiation. By the time the meeting actually convenes, it can feel as though you've been there for hours already.

Russell Information Sciences, of Laguna Hills, Calif., has automated many aspects of meeting logistics in an enterprisewide network-software package called Calendar Manager. When someone initiates a meeting, Calendar Manager (which operates interactively across DOS, Unix and VMS networks) automatically consults each invitee's personal calendar and schedules the meeting for the earliest commonly available time. It then informs the invitees of the scheduled time and delivers automatic audio or display-based reminders as the meeting approaches. According to company promotional materials, the product can also reserve meeting rooms and any needed equipment or services. In future versions of Calendar Manager, Russell plans to include interfaces to wristwatch paging systems, palm-sized computers and other mobile peripherals.

Russell Information Sciences can be reached at 714 362-4000.

Early Warning System

As software quality becomes more of a burning issue, some developers are trying to integrate testing early on in the development life-cycle. One way to do this is with automated "testware," software like AutoTester Plus, released early this year by AutoTester Inc. This personal computer-based software kicks off testing procedures even before application coding is completed.

AutoTester generates application-specific automated operators that run quality and functionality tests and then report on the findings. Any necessary modifications to applications can then be made at the specification stage. If developers make a change to one part of an application, AutoTester will automatically cross-reference the rest of the application and alert the user if the modification affects other parts of the program.

For further information on AutoTester for DOS-based PCs, which has two modules priced at $5,000 and $25,000, call the Dallas-based company at 214 706-3319.

What You See

Feeling blue about your desktop graphics capabilities? Three new additions to Silicon Graphics' IRIS Indigo family of RISC PC products will help you expand your palette. IRIS Indigo XS—an 8-bit (virtual 24-bit) system with very high (1280x1024) resolution, 60 or 72 Hz refresh rate and an optional z-buffer—is geared toward entry CAD and CASE, priced at $13,000, and includes a 16" color monitor, keyboard, mouse and 16 MB of memory. The XS24 adds 24-bit true color, providing 16.7 million colors as opposed to the 256 of an 8-bit system. Targeted toward professionals doing solids modeling or publishing, it costs $15,000.

The IRIS Indigo Elan is the line's flagship product. Delivering 1 million 3D vectors, 225K 3D triangles and 100K 3D quads per second, the system features texturing, transparency and atmospheric effects necessary for real-time motion and interactive realism. Suitable for CAE and molecular modeling, the Elan costs $27,000 and includes a 19" monitor, keyboard, mouse and 16MB of memory.

All Silicon Graphics systems run the IRIX operating system based on Unix System V and include Workspace, a visual interface to IRIX; IRIS Explorer, a data-visualization package; and IRIS Showcase, a tool for basic presentations and word processing. For more information call 800 800-4771.

Go Ahead and Roam

End users tethered to the cables that bind them have a new way to expand their computing horizons. DFM Systems has added a radio frequency option to their TraveLite PC that allows users to roam within a network.

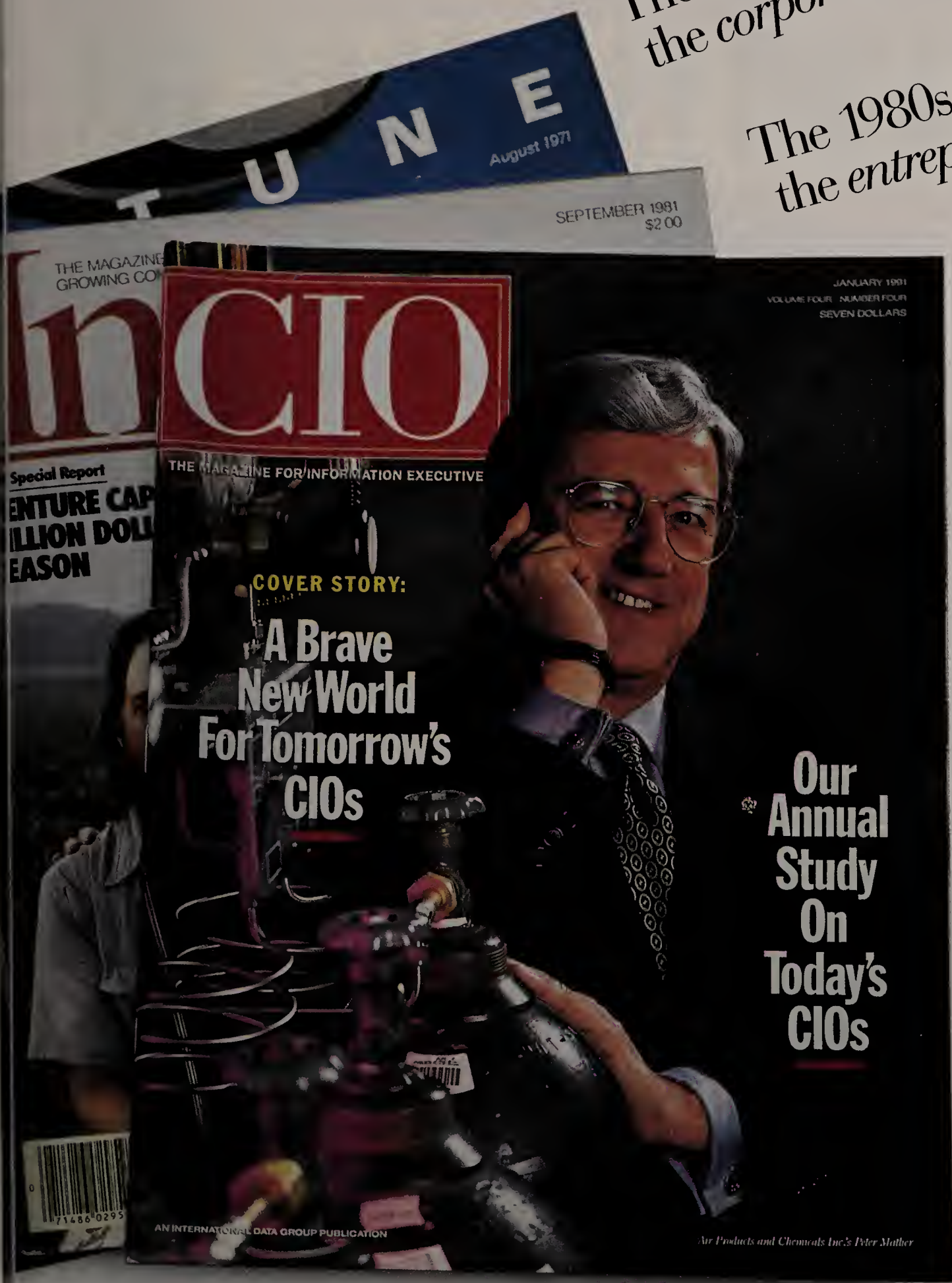
The 5.5 pound TraveLite operates in touchscreen, pen-based, notebook or desktop mode. The RF Spread Spectrum option is fully compatible with Novell NetWare and lets a user receive or enter data within an indoor range of up to 800 feet, and longer outdoors. Installation of the option, which is being marketed for use on loading docks and in warehouses where users often need to compute on the run, does not require cabling or an FCC site license.

Other available options for the TraveLite include mass storage, 20, 40, 60 and 80MB hard drives, an internal modem, a bar-code wand, 16 MHz operation and digitized voice. Standard features include serial, parallel, keyboard, modem and video-out connectors.

Suggested price for the standard TraveLite model is $3,466. Call 515 225-6744.

The 1970s belonged to the *corporate* executive.

The 1980s belonged to the *entrepreneurial* executive.



The 1990s belong to the *information* executive.

■ CIO–the magazine for chief information officers and other senior executives –is the single-most influential market in business today. 60,000 top decision-makers–98% exercising full spending authority–in a $277 billion market of computers, communications, software and services. CIO's colorful editorial package of plain-English reports, industry trends, in-depth case histories and up-to-the-minute surveys, news and views delivers the 1990's premier market 18 times a year. For more information, call Joe Levy, Publisher, at (508) 935-4035. ■

CIO

THE MAGAZINE FOR INFORMATION EXECUTIVES

One person with a checkbook is worth 50 people with opinions.

EVENTS

Prototyping and Rapid Application Development

Chicago Hilton & Towers, Chicago
May 4-6
Digital Consulting Inc.
508 470-3880

Topics include prototyping and RAD, consensus management, CASE and 4GL software and rapid data modeling. The attendees will participate in case studies through group exercises and software demonstrations through workshops. Registration fee: $1,095.

EDI '92: Five Years of Breakthrough Thinking

Seattle Sheraton, Seattle
May 11-13
Data Interchange Standards Association
703 548-7005

This conference addresses the EDI educational needs of key industries such as purchasing, banking, transportation, insurance, retail, aerospace and communications. Registration fees: $535 for members; $595 for nonmembers.

Securing Your Networks

Hyatt Regency, San Antonio, Texas
June 8-10
Computer Security Institute
415 905-2626

This conference consists of six tracks and 51 workshops devoted to network security. Other features include a vendor display program, speaker presentations and a tour of local computing facilities. Registration fees: $895-$990.

SUPERCOMM/International Conference on Communications '92

McCormick Place, Chicago
June 14-18
USTA, TIA, and IEEE Communications Society
708 248-5302

Workshops and tutorials concentrate on broadband networking, spread-spectrum systems, technology management and network synchronization. An interactive display demonstrates the impact of telecommunications technology on education. Registration fees: $145 - $425.

CIO Sales Offices

President and Publisher
JOSEPH L. LEVY
508 935-4601

Director of Marketing
CATHY O'LEARY HAYES
508 935-4521

Inside Sales Rep., List Services
STEPHANIE LEGELIS
508 935-4433

Sales & Marketing Specialist
BRIDGET CAMMARATA
508 935-4035

CIO Publishing Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 872-8200, FAX 508 872-0618

NEW ENGLAND

Regional Director/Advertising Sales
LINDA L. BURTON
508 935-4039

CIO Publishing Inc.
492 Old Connecticut Path
PO Box 9208
Framingham, MA 01701-9208
508 872-8200, FAX 508 872-0618

EAST COAST

Regional Director/Advertising Sales
MICHAEL J. MASTERS

Advertising Sales Assistant
PATRICIA GABELMANN

CIO Publishing Inc.
30 Two Bridges Road, Suite 340
Fairfield, NJ 07004
201 227-1140, FAX 201 227-1565

MIDWEST/SOUTH

Regional Director/Advertising Sales
BILL McDONOUGH

Advertising Sales Assistant
CAROL LEE GOCKENBACH

CIO Publishing Inc.
10400 West Higgins Road, Suite 300
Rosemont, IL 60018
708 827-4515, FAX 708 827-9159

WEST COAST

Regional Director/Advertising Sales
GERALD E. PARSONS

Regional Manager/Advertising Sales
RICHARD BASTAS

Advertising Sales Associate
JAY LAMPUS

CIO Publishing Inc.
220 Montgomery Street, Suite 1120
San Francisco, CA 94104
415 398-8200, FAX 415 398-4649

CIO INDEX

Page numbers refer to the first page of the article(s) in which the company is mentioned. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

Company Index

AT&T Bell Laboratories 62
Addison-Wesley Publishing Co. Inc. 72
Advanced Telecom Services Corp. . 62
Alaska Airlines 34
American Airlines 14
American Express 14
American Management Systems ... 14
Ameritech 62
Amway Corp. 62
Apple 14, 72
AutoTester Inc. 68
Banc One 34
Bell Atlantic 62
Brown & Root Inc. 14
Brush Wellman Inc. 54
Coal Services Corp. 44, 48
Computer Associates 54
Computer Support of N.A. 34
DataAids 48
Digital Equipment Corp. 48, 54
Dream Machine Inc. 14
Dyncorp 44, 48
Executive Insight Group Inc. 14
FGIC 34, 44, 48
First Bancorporation 14
Forrester Research Inc. 34
Frito-Lay Inc. 14
GPU Nuclear 58
Harley-Davidson Inc. 34
Home Mutual Life Insurance Co. .. 34
Honeywell 34
IBM 14, 48, 54, 72
Input 34
Intel 72
International Computer Negotiations Inc. 14
International Data Corp. 14
Joseph E. Seagram & Sons 14
Jossey-Bass Publishers 72
Magnavox Advanced Products & Systems Co. 14
McKesson Water Products Co. 34
Merrill Lynch 48
Meta Group 34
Microlog Corp. 14
National Semiconductor Corp. 72
NCR Corp. 34, 44, 48
New York Life Insurance Co. 14
Northern Telecom 14
Novell 14, 44, 68
Pennsylvania Blue Shield 34
Psychsoft 14
Rockwell International 48
Russell Information Sciences 68
San Diego Gas & Electric Co. . 34, 48
Silicon Graphics 68
Taylor Medical Inc. 44
Texaco Inc. 34
Texas Instruments 62
Ticketmaster 14
Travelers 48
Vanguard Communications Corp. .. 62
Voice Processing Corp. 62
Xerox Corp. 14, 28

Advertiser Index

AT&T 21, 57
AT&T Paradyne C3
AT&T Technologies 36
Answer Computer Inc. 17
Arcus Data Security Inc. 60
CIO Publishing Inc. 13, 69
Comdisco 15
Computer Associates Intl. Inc. . . 2, 65
Computer Bowl 71
Cylix 25
Digital Equipment Corp. C2, 12A
Dream IT 67
Dun & Bradstreet Software 18
EDS 26
Early Cloud & Co. 6
Everex Systems Inc. 50
Fujitsu Ltd. 43
IBM Corp. 40
Information Resources Inc. 23
Informix C4
NCR Corp. 4
Oracle Corp. 9
Society for Info. Management 59
Software AG 32
Spectrum International 12
Texas Instruments Inc. 10
US Sprint 47
Xerox Corp. 63

Editorial, Advertising and Business Offices: 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208–(508) 872-8200. **Postal Information:** CIO (ISSN 0894-9301) is published monthly; and semimonthly in April, May, June, September, October and November by CIO Publishing Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1992 by CIO Publishing Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol ‡ **Microfilm:** CIO issues and articles can be purchased on 16mm and 35mm microfilm and on 105mm microfiche through University Microfilms International, Serials Acquisitions Department, 300 N. Zeeb Road, Ann Arbor, Michigan 48106. **Subscriptions:** Address subscription inquiries to CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208 or call (800) 788-4605. CIO is distributed free of charge to qualified top information executives. To all others, the one-year basic rate for the U.S. and Canada is $94. For rates to other countries, please write the publisher. The single copy price is $7. All subscriptions payable in U.S. funds only. Please allow four to six weeks for new subscriptions to begin. **Change of Address:** Please allow four to six weeks for change of address to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

THE ASSOCIATION FOR COMPUTING MACHINERY PROUDLY PRESENTS

THE COMPUTER MUSEUM'S 1992 COMPUTER BOWL

FRIDAY MAY 1, 1992

THE HASSLE IN THE CASTLE

ANOTHER TECHNICAL KNOCKOUT

EAST vs WEST

CHARLIE *"JOHANN SEBASTIAN"*

BACHMAN vs SHOCH

JOHN F. *"FUTURE"*

Captain, Bachman Information Systems, Inc.

Captain, Asset Management Company

BILL *"THE ELBOW"*

MACHRONE

Ziff-Davis Publishing Company

vs

JEFF *"THE Kkiller"*

KALB

MasPar Computer Corporation

DR. DAVID L.

"HALF" NELSON

Fluent Machines Inc.

vs

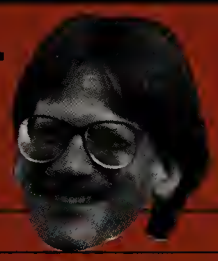
RUTHANN

"THE MIGHTY" QUINDLEN

Alex. Brown & Sons

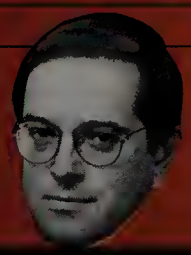
ANDY *"M.C."*

RAPPAPORT



The Technology Research Group, Inc.

vs



VERN *"THE ACE"*

RABURN

Slate Corporation

THE EXAMINER

BILL GATES

Microsoft Corporation

PAUL *"BEARER"*

SEVERINO

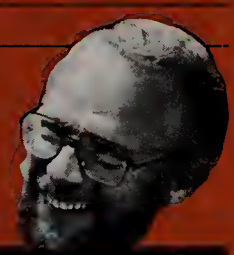
Wellfleet Communications, Inc.

vs

DR. JOHN E. *"KNOCK KNOCK"*

WARNOCK

Adobe Systems, Incorporated



LIVE SITE THE PARK PLAZA CASTLE BOSTON, MASSACHUSETTS

The Computer Bowl

CLOSED CIRCUIT SITE XEROX PALO ALTO RESEARCH CENTER, CALIFORNIA

This is the rematch fans have been waiting for all year. Ever since the last action-packed Technical Knockout, the West has been clamoring for another go at the Champions from the East. On May 1, they'll get their chance to lace 'em up.

Join us at live at ringside or at the closed circuit site for all the blow by blow excitement of *The Hassle In The Castle* – The Computer Museum's 4th Annual Computer Bowl. It's sure to be *Another Technical Knockout.*

Presenter

The Association for Computing Machinery

Underwriters

Apple Computer, Inc.
Digital Equipment Corporation

Judges

Pamela McCorduck
Author

Heidi Roizen
T/Maker Company

Founders

Pat Collins Nelson & Dr. David L. Nelson

Official Sponsors

Bank of Boston
The Bank

BASF Information Systems
The Diskette

Intel Corporation
The Microprocessor

MasPar Computer Corporation
The Massively Parallel ComputerCompany

Merrill, Pickard, Anderson & Eyre
The Venture Capital Firm

Price Waterhouse
The Accounting Firm

Radius Inc.
The Systems Enhancement Company

Robertson, Stephens & Co.
The Investment Bank

Stratus Computer, Inc.
The Transaction Processor

Visix Software Inc.
The High Performance Workstation Software Co.

Wellfleet Communications, Inc.
The Internetworking Company

Promotion

PARTNERS & Simons

The Computer Bowl is broadcast on the PBS series, Computer Chronicles, hosted by Stewart Cheifet. The Computer Bowl is a project to benefit the educational programs of The Computer Museum, 300 Congress St., Boston, MA 02210.

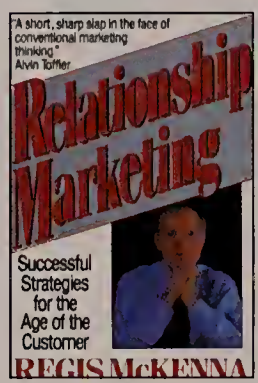
For tickets and sponsorship information 617-426-2800 ext. 346.

Engraving

HK Graphics

OFF THE SHELF

RELATIONSHIP MARKETING
Successful Strategies for the Age of the Customer
By Regis McKenna
Addison-Wesley Publishing Co. Inc. (Reading, Mass.), 1992
242 Pages, $19.95



The fashionable argument that image is everything is ... well ... a little superficial. Brand names no longer command the consumer loyalty they once did. Competing companies sign up so many celebrity spokespeople that no one can remember who is pitching what. These developments, in conjunction with the public's growing disaffection from Madison Avenue's excesses, expose what consultant Regis McKenna calls advertising's "dirty little secret"—that it serves no useful purpose.

McKenna has diagnosed the condition that causes so many U.S. businesses to falter: an emphasis on making or selling rather than on satisfying the customer. His prescription, set forth in *Relationship Marketing* (a follow-up to his 1970s bestseller, *The Regis Touch*) is both far-seeing and pragmatic: "To build lasting positions in the market, companies must first build strong relationships with customers, suppliers, resellers, industry influencers and members of the financial community. They must take advantage of the industry infrastructure—the key people and companies that make the industry tick."

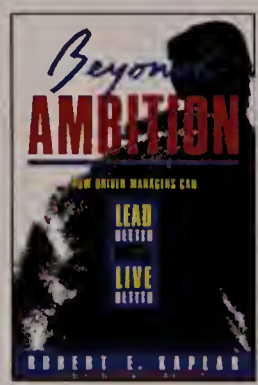
According to McKenna, companies must "integrate the customer into the design of the product and design a systematic process for interaction that will create substance in the relationship." The emphasis is on sharing knowledge and championing corporate credibility.

Relationship Marketing is particularly valuable because of McKenna's extensive experience in high-tech industries (*Newsweek* dubbed him "Silicon Valley's Svengali.") Because technology is such a major investment, customers are likely to be far more demanding when it comes to matters such as support, upgrades and education, as well as product quality. And because it is so volatile, there are more opportunities to define and, therefore, "own" the market.

One of the book's greatest strengths is McKenna's use of real companies, rather than fictional representations or composites. IBM is held up as a company that exploits "fear, uncertainty and doubt" in order to scare customers away from smaller competitors. And the entire last chapter is devoted to "The Macintosh Story"—a fascinating history that serves as a kind of microcosmic view of the evolution of marketing concepts.

The goal of marketing in the '90s is to find new ways to create and sustain loyalties in customers who are warier and better informed, and who enjoy more choices than a decade ago. *Relationship Marketing* can be instrumental in attaining that goal.

BEYOND AMBITION
How Driven Managers Can Lead Better and Live Better
By Robert E. Kaplan, with Wilfred H. Drath and Joan R. Kofodimos
Jossey-Bass Publishers (San Francisco & Oxford), 1991
269 Pages, $27.95



The executive temperament is distinct. According to *Beyond Ambition* author Robert Kaplan, most successful top executives possess an expansive character: They are driven to expand themselves into their environment in order to gain mastery over it. This is necessary if executives are to lead well, Kaplan writes, but "there is an important line to be drawn between largely effective expansive executives who go to productive extremes and significantly flawed expansive executives who go to destructive extremes. In the one instance, there are certain *necessary* losses occasioned by the exercise of leadership by high-powered human beings. In the other instance, there are *unnecessary* losses, serious ones, caused by excessive ambition." *Beyond Ambition* addresses the problems of this latter group.

Power itself exacerbates expansiveness, according to the author. The minor flaws of generally effective executives can become magnified as they gain influence—damaging both their ability to lead and their organizations. Yet "through self-understanding, extremely expansive executives can become less destructive," Kaplan writes. Behavioral change is not enough; only character-based change will produce real and lasting results.

The book is based on research conducted by Kaplan, a senior fellow at the Center for Creative Leadership in Greensboro, N.C., and his coauthors, involving over 40 executives. They term their method of investigation "biographical action research" because they collect data on the individual's history and private as well as professional life, and because they provide a service to the participating executives. Kaplan's method helps executives to develop self-awareness—into what drives them and governs their management style—and to translate that into action by creating a "shift in emphasis" in their character. For instance, once one subject became aware that he was driven to succeed by a need to establish his own sense of worth, he was able to remain highly motivated while becoming less anxious and less critical of others.

The book is written for three audiences: executives who want to "grow, improve and find fulfillment," professionals and managers involved in executive development, and students of management. Anyone truly interested in optimizing the performance (and well-being) of those in power—and of those who work with them—would do well to read it.

Put AT&T Paradyne's winning team to work for you.

Call **800 482-3333, Ext. 540**, complete and mail this card today, or FAX it to **813 530-2103**.

____ Yes, I'd like to know how my company can take advantage of AT&T Paradyne's expertise in hybrid networking.

My networking needs are: ____ Implementing a cost-effective networking strategy for my branches and/or remote sites

____ Migrating from analog to digital service

____ Other (Please specify) _____

____ Send me more information on the products and services that won these awards.

Name _____

Title _____

Company _____

Address _____

City _____ State _____ Zip _____

Telephone (_____) _____

AT&T Paradyne

A B C

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS MAIL PERMIT NO. 339 LARGO, FL

POSTAGE WILL BE PAID BY ADDRESSEE

AT&T PARADYNE
LH-107
8545 126TH AVE. N.
P.O. BOX 2826
LARGO, FL 34649-9852

AT&T Paradyne won 1st place in 9 out of 10 CSU\DSU and T1\T3 categories.

For a cost-efficient hybrid networking strategy, call the winning team today.

800 482-3333, Ext. 540

AT&T Paradyne

Informix Database Technology Helps World Vision Reach The Children.

When World Vision, a non-profit international Christian relief and development agency, needed to manage $225 million annually in fundraising and distribution, they turned to us, Informix, the experts in UNIX® relational database management systems.

Mainframe-Caliber Performance.

World Vision required a UNIX system that could deliver mainframe-caliber performance at a fraction of the cost. The system had to provide quick response to a large number of simultaneous users. It had to provide on-line access to donor data, including correlation of donors and recipients. And it had to be easily modified for special projects, such as emergency relief.

World Vision chose Informix's UNIX solution.

One Million in Donor Database.

All of World Vision's needs are being met—including storing 10 million donation postings, maintaining a donor database of more than a million people, making data available around the clock/seven days a week, and providing application portability, networked capabilities, and hardware independence.

World Vision and thousands of other organizations have called on us for 12 years to successfully handle their critical data.

If you're considering UNIX for data management, talk to Informix. Because we're the experts.

Call 1-800-688-IFMX.

INFORMIX®

THE UNIX DATABASE EXPERTS.

© 1992 Informix Software, Inc. Informix is a registered trademark of Informix Software, Inc.
All other names indicated by ® or ™ are registered trademarks or trademarks of their respective manufacturers